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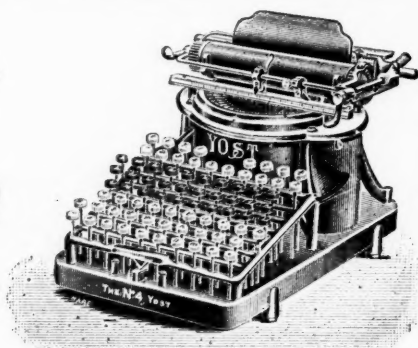
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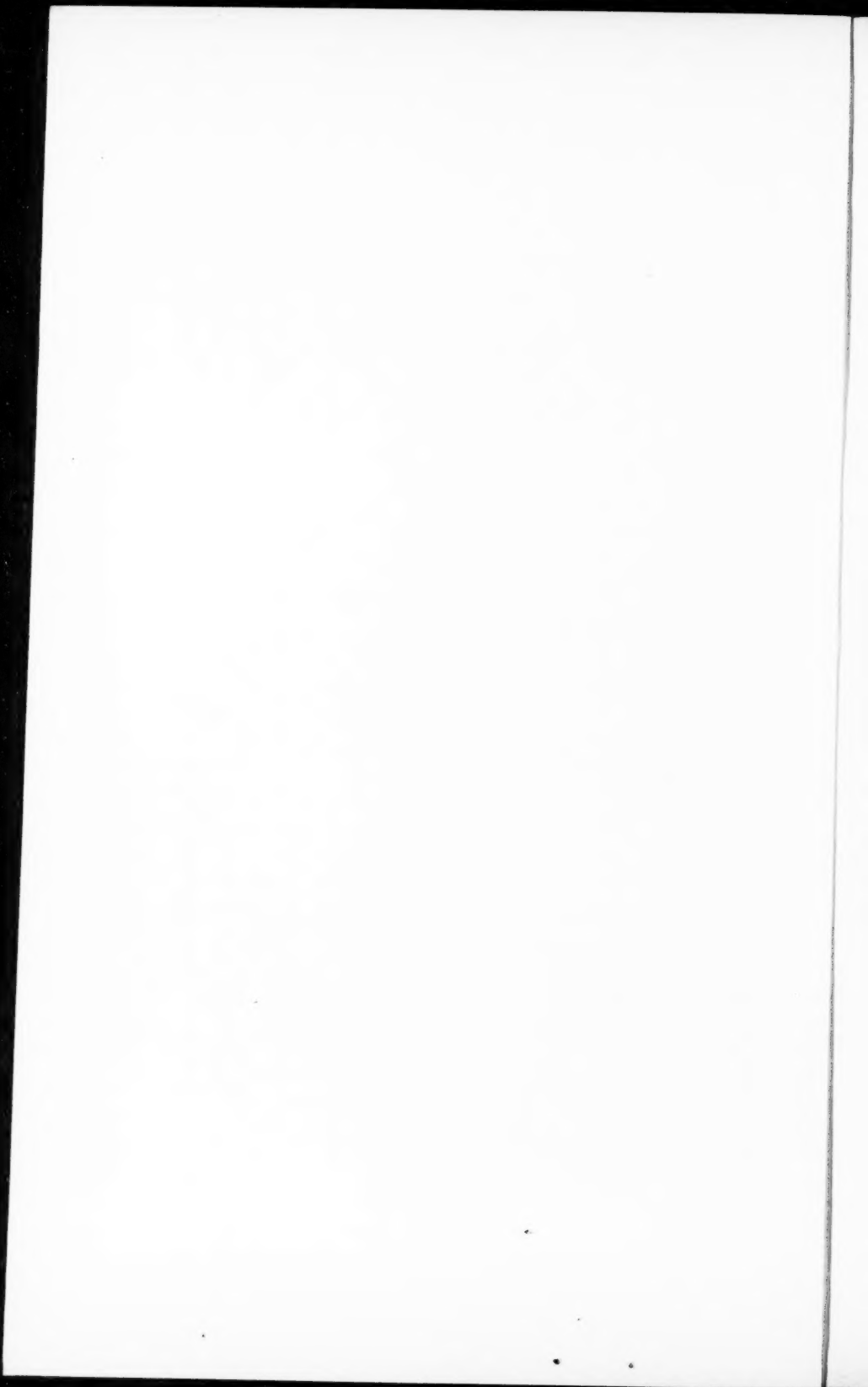


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LIEUT.-GENERAL LORD SALTOUN, K.T., K.C.B., G.C.H.

*(Colonel of the 2nd (Queen's Royal) Regiment, 1846-1853.)*

AFTER SIR THOMAS LAWRENCE, P.R.A.



# THE JOURNAL

OF THE

## ROYAL UNITED SERVICE INSTITUTION.

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*[Authors alone are responsible for the contents of their respective Papers.]*

### LIEUT.-GENERAL ALEXANDER GEORGE, LORD SALTOUN, K.T., K.C.B., G.C.H.

ALEXANDER GEORGE FRASER, 16th Lord Saltoun, the elder son of the fifteenth Lord Saltoun of Philorth, was born in London on the 12th April, 1785. His mother, a remarkable woman who lived to the age of 97, was Marjory, daughter of Simon Fraser, of Ness Castle, Inverness, a Director of the East India Company. He was educated at Eton, where he showed early evidence of the courage and self-reliance for which he was afterwards distinguished, by being the first Etonian to jump into the Thames from the parapet of the centre arch of Windsor Bridge, and by his successful fight with the champion bargee.

He entered the Service on the 28th April, 1802, as an Ensign by purchase in the 91st Argyllshire Highlanders, of which his uncle, Major-General Duncan Campbell, of Lochmell, was colonel. Four months later—on the 2nd September—he purchased a lieutenancy in the 2nd Battalion of the 35th Foot, commanded by his friend General Henry Fletcher, of Saltoun; but was placed on half-pay on the reduction of the battalion in May, 1803. On the 25th June, 1803, he exchanged from half-pay to a lieutenancy in the 42nd Highlanders; and on 23rd November, 1804, to Lieutenant and Captain in the 1st Foot Guards, in which regiment he served continuously for nearly thirty-three years.

In September, 1806, he accompanied the 3rd Battalion of the 1st Foot Guards in the Expedition to Sicily, where it formed part of the Guards Brigade under Major-General Henry Wynyard, and he returned to England with it in December, 1807. In September, 1808, he again left England as second subaltern of the Light Infantry company of the 3rd Battalion, part of the Guards Brigade of Major-General Henry Warde, which landed at Corunna under Sir David Baird. From Corunna, Baird marched to meet Sir John Moore at Mayorga, and in the terrible winter retreat which followed the Guards distinguished themselves by their good order and discipline. Saltoun was present with his company throughout the severe campaign, and at the battle of Corunna in January, 1809, and Sir John Moore had spoken highly of the conduct of the Guards, their marching, and high state of discipline. Sir John was carried off the field by six men of the 1st Foot Guards and 42nd Highlanders, the two regiments that were nearest to him when he fell.

In this campaign Saltoun gained his first experience of light infantry duties, and he acquired it in a good school. No pains had been spared in the training of the light companies of the Guards, and it was no small measure of praise for Sir John Moore to have spoken of them as moving better than any others he had seen except in his own regiment, the 52nd Light Infantry, which he had personally instructed.

In 1809, Lord Saltoun's battalion formed part of Major-General Moore Disney's Brigade of Guards in the unfortunate and ill-conducted Walcheren Expedition. Even his iron constitution was not proof against that terrible malaria which killed over 4,000 men and officers; and in after years he suffered in no slight degree from its effects. Early in 1811 his battalion was sent out to relieve the 2nd Battalion at the Siege of Cadiz; and he was present in the following year at the storming of Seville. At the close of 1812 he joined the 1st Battalion of his regiment during the retreat of the army from before Burgos, and from that time, with the exception of a few weeks' leave in England, he went through the Peninsula campaign with the 1st Brigade of Guards. He commanded the Light Infantry company of his battalion throughout the campaigns of 1813 and 1814, and was present in the actions of the Pyrenees, the forcing of the Bidassoa, the battle of the Nivelle, and the actions of the 9th, 10th, and 12th December, on the Nive. On the 25th December, 1813, he was promoted captain and lieutenant-colonel in his regiment, and the light companies of the Brigade of Guards were afterwards placed under his command. This promotion would have sent him to the home battalion, but, anxious to continue on active service, he applied for, and at the beginning of February, 1814, received, the above command, which he retained with great credit to himself to the end of the war. In that capacity he was present at the passage of the Adour, the investment of Bayonne, and the sortie of the 14th April. At the peace he returned to England.

On the recommencement of hostilities, in 1815, he joined the 3rd Battalion, which had preceded him, near Enghien; and on the 15th May was again placed in command of the Light Companies of the Guards. He was engaged at Quatre Bras, where the leading Brigade of Guards, after a twenty-six-mile march, arrived at a critical juncture—when the French, having gained possession of the Boissu Wood, were seriously threatening Lord Wellington's communication with the Prussians. Saltoun was proverbial in the army for his bravery, and his coolness in trying circumstances. Directly the young and impetuous Prince of Orange met the Guards he ordered the light companies under Saltoun to drive the enemy out of the wood. Not perceiving the enemy at the moment, as they were mostly concealed from view, Lord Saltoun asked the Prince where they were. The Prince, mistaking this for hesitation, replied in a hurried, hasty manner, "Sir, if you don't like to undertake it, I'll find someone." Saltoun, in the quietest manner, and quite unperturbed, repeated his question; and, on its being pointed out to him that they were in the wood, formed his line of skirmishers and led the attack.

At the battle of Waterloo he played a leading part in the famous defence of Hougoumont, holding the garden and orchard against all the onslaughts of the French. At one time he rejoined his brigade, but returned with the light companies and re-occupied the wood and orchard after the Nassauers and Hanoverians had been driven back. How the French made several subsequent attacks, with more or less partial success, against the front of Saltoun's post, and how they were, in the end, always repulsed has been picturesquely described over and over again. The following anecdote is told of Lord Saltoun: During a lull, just after the repulse of one attack, and before the final one, Wellington was on his horse close to the 1st Brigade, and, after looking carefully with his glass along the whole of the French position, turned to those of his staff near him, saying, "Well, I think they are pretty well told out now." Saltoun immediately said to one of the staff officers, "I don't know; when I was outside the wood at Hougoumont this morning, before the action began, I watched a column of men, as far as I can guess about 5,000 or 6,000, go into a hollow opposite. I have kept my eye on this spot all day, and have never seen them come out yet." Upon this being repeated to the Duke, he turned his glass in that direction, and, after a moment's pause, exclaimed, "By God! he is right; they are coming out now." And it is said that the Duke was so much struck with the coolness and power of observation exhibited by Lord Saltoun in such circumstances that he ever afterwards spoke of him as a thorough soldier. When the Guards made their famous charge on the Old Imperial Guard of France they were led by Major-General P. Maitland, Lieut.-Colonel Lord Saltoun, Lieut.-Colonel John Reeve, and Captain James Gunthorpe, who placed themselves in front and sprang forward to the charge. In spite of the supposed historical reply of the French Guard, "*La Garde meurt, mais ne se rend pas!*" General Cambronne, who commanded part of it, did surrender, and it was Lord Saltoun himself who received his sword and gave him in charge to a private of the regiment, who conducted him to Brussels. Lord Saltoun had two horses killed under him, and a bullet passed through his cap. When each horse fell the saddle was, of course, ungirthed, and, with the cloak rolled up across the pommel, was placed upon another horse. After the battle, when his servant unrolled the cloak, no fewer than seventeen musket-balls were found in it, many of which must have been fatal had they not been stopped by the cloak. Saltoun's conduct was highly spoken of by General Maitland, and Wellington commended his coolness, bravery, and power of observation. For his distinguished conduct he was created a C.B., received the knighthood of the Order of Maria Theresa of Austria, the 4th Class of St. George of Russia, and the Waterloo Medal. After the battle, when the scattered hosts of France were followed up without delay, Saltoun commanded the light companies which preceded the 3rd Battalion of his regiment at the assault and capture of Peronne on the 26th of June. He was struck by a grape-shot as he was mounting the scaling ladder, but fortunately the shot, striking a purse full of coins in his pocket, lessened the blow, which inflicted but a slight injury. Although he had many



narrow escapes, this was the only occasion upon which he was hit during his long service. In the subsequent march on Paris he had temporary command of the 2nd Battalion. After serving with the Army of Occupation until 1818 he returned to England.

On the 27th May, 1825, Lord Saltoun was promoted colonel in the Army, and on the 17th November following became third major in the Grenadier Guards, and succeeded to the command of the 3rd Battalion. On the 12th February following he was transferred to the 1st Battalion, which he commanded until his promotion to major-general on the 10th January, 1837. It is in the uniform of the Grenadier Guards that the portrait was painted, from which this illustration is taken. The officers of the regiment wore wings, but the field officers had an epaulet, in addition, on each shoulder.

Lord Saltoun proceeded to China during the war of 1840-42. He commanded the 1st Brigade at the capture of Chin-Kiang-foo, and in the advance on Nankin. At the former, his brigade, which included the 26th and 98th Regiments and the flank companies of the 41st Madras Native Infantry, drove the enemy before them over the hills and destroyed the encampments. His services were highly spoken of by Lord Gough, who commanded the Expeditionary Force, he received the thanks of Parliament, the medal for the campaign, and was promoted to K.C.B. He subsequently commanded the troops in China until 1844.

On the 23rd February, 1846, he was appointed colonel of the 55th Regiment, and on the 7th August was transferred to the colonelcy of the 2nd (The Queen's Royal) Regiment. On the 9th November he was advanced to the rank of lieutenant-general. In 1821 he had been appointed Lord of the Bedchamber to George IV., in which year he was made a G.C.H., and he became a Knight of the Thistle in 1851, having in the meantime received the Peninsular War medal with clasps for Corunna, Nivelle, and Nive. He died at Auchinroth, near Rothes, N.B., on the 18th August, 1853.

Though he never rose to the rank of a great commander, Lord Saltoun held the very highest reputation as a gallant soldier. His distinguishing qualities were a strong sense of duty, energy and activity of mind and body, and inflexible resolution in what he considered right. He was endowed with high personal courage and unflinching integrity; and, though his voice and manner were somewhat stern and abrupt, they but veiled the kind heart that beat beneath. His chief title to distinction lies in his having acted a gallant part in the defence of Hougoumont, and added lustre, though it were unneeded, to the brilliancy which will be ever associated with the conduct of H.M. Foot Guards in the great victory of Waterloo.

R. H.

Wednesday, February 12th, 1896.

Colonel J. B. STERLING (late Commanding Coldstream Guards and North London Volunteer Brigade), in the Chair.

## THE VOLUNTEER OF TO-DAY: HIS MILITARY STATUS, DUTIES, AND TRAINING.

*By Major A. G. RICKARDS, V.D., 1st London Rifle Volunteers  
(London Rifle Brigade).*

IN November last a lecture was given in this theatre upon "The Tactical Training of Officers of Volunteers," by Lieut.-Colonel Balfour, Commanding the London Scottish Rifles. The Commander-in-Chief did the Volunteer Officers the honour of presiding in the chair, and the lecture was listened to with the greatest interest by those of them who were present, and I feel sure by the Regular officers also, some of whom, including Major-General Sir Francis Grenfell, the Inspector-General of Auxiliary Forces, and Major-General Lord Methuen, Commanding the Home District, took part in the discussion which followed.

The lecture, or, as I prefer to call it, the remarks and suggestions to which I am about to call your attention to-day, is intended as a sequel to Colonel Balfour's lecture; but it is fair to him to add that he is in no way responsible for it, and that it is solely the production of the lecturer, with the exception of one or two smaller matters in which some of my brother officers have been good enough to assist me. I should like also to add that, in making the remarks and suggestions for which I ask your patience and attention, and in giving this lecture upon the Military Status, Duties, and Training of Volunteers in the United Kingdom at the present time, I am conscious that, although I have had the advantage of serving for twenty-three years (first in the ranks, and for the last seventeen-and-a-half years as an officer) in two Volunteer regiments recruited from different classes of the community, there are other Volunteer officers, particularly commanding officers, as well as former adjutants of Volunteers, with greater experience, and better able to deal with the subject of the lecture, which is a wide one, than myself; and my excuse for having taken upon myself to address you must be the great interest I take in my subject.

The subject itself requires no apology or recommendation, for it is one which, I think, all here will regard as of considerable national importance and interest, especially at the present juncture of affairs abroad. If in any way the existence of the Volunteer force is to

be regarded as a substitute for the compulsory military service that exists on the Continent, a great responsibility lies upon those who serve in it to take care that it is as reliable a substitute as it can be made. I do not myself regard the Volunteer force as a substitute for compulsory service, but rather as an addition to the previously existing military forces of the country, because I do not think any Ministry would venture to introduce a Bill into Parliament for making military service compulsory, in the present state of public opinion in this country, if the Volunteer force did *not* exist; but I think the existence of the Force would probably postpone the revival of the Militia Ballot Acts, which are at the present time suspended, under an Act of 1865 (28 and 29 Vict., cap. 46), which is annually renewed. In connection with this subject, it may be as well here to point out that by Section 41 of the Volunteer Act, 1863, every officer of the Volunteer force, and every efficient Volunteer, as well as every non-commissioned officer of the Volunteer Permanent Staff, is exempted from liability to serve personally or to provide a substitute in the Militia, which liability, if the Militia Ballot Suspension Act of 1865 was not in force, would attach (with certain exceptions) to every male person in the United Kingdom between the ages of 18 and 30. As, then, the existence of the Volunteers *may* have the effect of continuing the suspension of the Militia Ballot Acts, and does, I think, create a certain sense of security in the public mind, it is clearly the duty of every Volunteer to justify that confidence, by acquiring such military knowledge and submitting himself to military discipline in such a manner and spirit, that the Volunteer force may not prove a broken reed, but a reliable auxiliary of the Regular forces if called out for actual military service.

I do not, in any sense, wish to lay down the law on the different points on which I am about to speak; but I venture to hope that my lecture will produce a discussion by others who may know more about the subject than I do, and call forth an expression of opinion which may be of service to Volunteer officers, and to those who are charged with the management and training of the Volunteer force. With a view to promoting discussion and eliciting practical suggestions, I shall endeavour to keep the various heads of my subject as distinct as I can, and to make my own comments and suggestions as clear as I can. I shall treat Parts I. and II. of my lecture, dealing with the military status and duties of the Volunteer, as shortly as possible, and only so far as is necessary, in order to realise the conditions under which, so far as he is personally concerned, the Volunteer has to be trained to fulfil the objects for which he is enrolled.

I desire, above all things, to make this lecture practical. I do not wish to give a dissertation upon the Volunteer Acts, the Regulations, or anything of that sort, but to ask for practical suggestions and comments on my own suggestions for what they are worth.

#### PART I.—MILITARY STATUS.

First, then, as to the *military status* of the Volunteer. He is a member of the military forces of the country for defensive purposes

only, giving his services without pay, with a view to acting as an auxiliary to the Regular and Militia forces of the country when invaded by an enemy; and his training must be sufficient to enable him, *at short notice*, to act as a member of such a defending force in his own country. It is hardly necessary to point out that a very small part of his time, and a comparatively small part of his thoughts and energies, can be given to learning his military duties, or even to military subjects, because the Volunteer in the ranks to-day is, I think I may say, invariably a bread-winner. When the present Volunteer force sprang into existence in 1859, there were, comparatively speaking, considerable numbers of country gentlemen, and men of good private means, to be found in the ranks of the Volunteers, who were masters of their own time; and although there are a few corps still existing, such as the University corps, the Inns of Court, and two or three more, where the ranks are composed of men who are, to a considerable extent, masters of their own time, and who, therefore, can attend parades or camps at different times of the year, the Volunteer ranks, generally, are now almost entirely filled with men whose hours are not their own; and who can only take holidays, and get away for training, when their civilian superiors allow them to do so; and who would, of course, lose their employment if they absented themselves without leave, for in these days of keen commercial competition the employer, I regret to say, is not by any means too ready to show his patriotism by giving his *employé* even three days' holiday in order to go into camp and learn how to defend his master's warehouse or shop in case of need. I will not further dwell upon this point now, as I must consider it more in detail when I come, later on, to discuss the question of the compulsory attendance of Volunteers in camp.

The Volunteer is only subject to military discipline, enforceable by his own superior officers, when he is under arms or on duty with his regiment or a part of it, when he can be put under arrest if an officer, and into custody if not an officer; but he can only be kept in arrest and custody as long as his regiment remains under arms. I may say, in the twenty-three years I have been in the Volunteer force, I have only seen this put into operation once, and that was in the case of a bandsman, a very good old soldier, but he beat the drum at the wrong time. The Volunteer becomes, however (under Article 374A of the Regulations for the Volunteer Force, 1895, confirmed by Her Majesty in Council), subject to military law when he joins a camp with the Regular forces, or is undergoing training and exercise with any portion of the Regular forces or with any portion of the Militia when subject to military law; and he would, I presume,<sup>1</sup> of course, be subject to the same law when called out, under Section 17 of the Volunteer Act, 1863, for military service in the case of "actual or apprehended invasion of any part of the United Kingdom," even if he were not brigaded with Regular troops (which, of course, he would probably be); and if, when so called out, he fails to assemble or

<sup>1</sup> I have since found that the enactment giving effect to this is to be found in the Volunteer Act, 1863, Sec. 23.—A. G. R.

march, unless incapacitated by physical infirmity, he will be deemed a deserter, and punishable accordingly by military law. At all other times, then, than actual or apprehended invasion of the country, or when serving with the Regulars, the Volunteer is only subject, for breaches of discipline when in uniform, to detention in custody while his regiment is under arms, and to dismissal from his regiment by his commanding officer (Volunteer Act, 1863, Sec. 21). Happily this power of dismissal, coupled with the fact that, in accordance with the Volunteer Regulations, it must be published in regimental orders, and disqualifies the man for ever afterwards from serving in any other Volunteer corps, has been hitherto found sufficient to enforce discipline; and it says much for the self-respect and desire of the Volunteer to obey orders, and, may I add, the discipline, that it should be so.

I may point out that a commanding officer cannot compel the attendance of a Volunteer at any one parade, and, consequently, can never foresee the number of men who will attend any given parade or field day (except by conjecture from previous experience, or by sending out a circular of enquiry); and inasmuch as the Volunteer must give his time primarily and preferentially to his civil employment, it is difficult to find any remedy for this undoubtedly unsatisfactory state of things from a military point of view. Happily, the patriotism which called the Force into existence in 1798, and doubled its numbers in 1802, bringing them up to 300,000, and recalled it into existence in 1859, when invasion was threatened, or thought to be threatened, by Napoleon III., or his Colonels—as it was actually in 1802 by Napoleon I.; and not less the military instinct and tastes of the men who compose the Volunteer force—which instinct and taste have for so many years, since the first fear of invasion passed away, kept the force in existence, and in an ever-increasing state of efficiency, in spite of an always increasing number of counter-attractions, and the means of availing themselves of them (including, lastly, golf and bicycling!)—and I venture also to think the still strong underlying feeling of patriotism, and a laudable determination to fulfil a duty which they have undertaken: these reasons, I say, are sufficient to induce them to make any reasonable sacrifice in order to attend parades and learn their work.

I do not know whether I might be permitted to give as strong an instance of military instinct operating on the Volunteers as I ever came across. It was that of a sergeant in my own corps, who spent, I think, a six weeks' holiday in a military kitchen at Aldershot in order to qualify as sergeant-cook of the regiment. I do not mean to say I should like to see all the Volunteers cooks, but that is a remarkable instance of a man having a *métier* and carrying it through.

The *military status* of the Volunteer, then, is that when under arms he is a soldier, or, if you prefer it, an auxiliary soldier, and not a mere amateur, but subject to a very qualified form of discipline, except when called out for actual military service; that he is enrolled for a particular purpose only, and required to devote only a very small part of his time and energies to learning his military duties; and that he

can leave the Force at any time, except when called out for actual military service, on giving fourteen days' notice.

That might appear, at first sight, a rather alarming thought, that the whole Volunteer force might dissolve itself in fourteen days, except when called out for actual military service. The only parallel case I can think of at this moment is that of the Metropolitan Police, whose members can give notice of resignation and so dissolve the Force in thirty days. I hope they will not do that, and I hope, and feel confident, the Volunteers will not either.

#### PART II.—MILITARY DUTIES.

Before I consider what are the military duties of Volunteers, let me state very briefly what I take to be the purposes fulfilled by the Volunteer force. The primary object of the Volunteers is, of course, the defence of the country from invasion; but they also, in my opinion, fulfil an important duty in forming the cadres, or rather dépôts, of a far larger force, which would undoubtedly be called into existence if this country were ever, unfortunately, to be engaged in a death struggle against a foreign Power, or, worse still, a combination of foreign Powers. And, further, I regard the Volunteers as feeders of the Regular Army, in case of real national stress. I will not believe that if New South Wales was able and willing to send a Volunteer contingent (commanded by and containing, I admit, many old Regular soldiers) to help the Soudan Expedition, considerable numbers of individual Volunteers, or even companies of Volunteers, would not volunteer for service outside Great Britain, *i.e.*, England, Scotland, and Wales; firstly, in Ireland, if it were seized by an enemy; and, secondly, on the frontiers of our Colonies. This, perhaps, is rather beside my subject, and, therefore, I will not go further into it. I may, in passing, call attention to the fact that the oath of allegiance which is taken by officers and Volunteers upon enrolment does not extend to service in Ireland. I believe the Militia can be used in Ireland. I hope I may be pardoned for this temporary digression from my more immediate subject. I was considering the purposes which, to my mind, are fulfilled by the Volunteer force, preliminarily to considering Part II. of my lecture relating to their military duties, and I was speaking of Volunteers volunteering for special service abroad as a Volunteer contingent, or enlisting in the Regulars, which latter, to a small extent, goes on in time of peace, and in time of war would, I feel no doubt, considerably increase. The numbers who enlisted in 1894 were 2,287, and it was stated here recently that the numbers in 1895 were in round figures 3,000; but, of course, for reasons which are obvious, they do not many of them enlist—they are drawn from a somewhat different class, I do not say whether better or worse. In dealing with this subject, one must be careful not to confuse it with the object of the Volunteer Act, 1895, which enables the Secretary of State to avail himself of the services of any members of, or any parts of, a Volunteer regiment, for actual service in the United Kingdom, whenever an order for the embodiment of the Militia is in force, *i.e.*, “*in case of imminent national danger or of great emergency*” (Militia Act, 1882, Sec. 18).

That Act of 1895 is an Act, in my opinion, of considerable importance and wider consequence than might at first sight appear.

To return, however, to my immediate subject, namely, the military duties of the Volunteer. The remarks I made as to the military *status* of the Volunteer apply equally to the different arms of the Volunteer force, *i.e.*, light horse, artillery, engineers, and rifles. The military *duties* of these different branches, of course, vary with the functions of the particular branch to which they belong; but the general point to be aimed at is to bring all branches into such a state of efficiency that they may be able at *short notice* to co-operate with—that is to say, to take the field, march, and fight with—the Regular forces in defence of the country.

I always object to the expression "*Volunteer Army*," because it suggests a Force that would be able to act independently of the Regulars, instead of with and auxiliary to the Regulars; and it is obvious that the Volunteers could not as a Force act independently of the Regulars with their present relative deficiency of cavalry, artillery, and engineers (not to mention transport), which deficiency, I think, is in itself much to be regretted. The following were the figures kindly supplied to me by Colonel Borrett, of the Inspector-General of Auxiliary Forces' Department, for the different arms of the Volunteer force in 1894. I asked him for those of 1895, but he pointed out that they were not made public yet, and, therefore, he could not provide them:—Volunteer light horse, 242 total; 175 efficient. Artillery, 41,982; efficient, 40,240. Engineers, including submarine, mining, and railway engineers, 13,072; efficient, 12,721. Rifles, 174,547; efficient, 169,949. Medical Staff Corps, 1,485; efficient, 1,440. "Non-efficient" may not mean that a man is not an effective Volunteer, but he may have been ordered abroad and various things. It does not follow he is not a good Volunteer. That makes the total for 1894, 231,328 gross, and 224,525 efficient, or about 96 per cent. efficient. Those, then, are the figures for 1894, and while I say I object to the expression "*Volunteer Army*" as a Force apart from the Regulars, I, of course, should add that Volunteer regiments, companies, and sections must be trained to act so far independently that a regiment or a company or a section should be able to take up an independent position, and, if necessary, act on its own initiative. The duties of Volunteer cavalry would, of course, include reconnaissance and scouting (aided, in this respect, by cyclists from rifle regiments); and the engineers, artillery, and infantry of the Volunteer force must also possess a practical knowledge of the various duties of their respective arms in the field, more especially those relating to preparing, occupying, and holding defensive positions. I do not myself include *garrisoning towns*, as distinguished from occupying them for defensive purposes, in view of the possibility of the bulk of the Regular forces being sent out of the country, as a part of the military duties of Volunteers, although it is often mentioned as *one* of their probable duties, because I imagine there would nearly always be sufficient Regulars in the country to do this, and if not their place would, in my opinion, be more properly taken by the Militia, who go into quarters



or under canvas every year for twenty-seven days consecutively, and are, therefore, more conversant with this duty.

The military duties, therefore, for which the Volunteer must be trained, are those which he would have to perform as an auxiliary of and in co-operation with the Regulars and Militia in case of invasion; and although I assume the probability of the Volunteers being called out, say, from seven to thirty days before an actual landing of foreign troops could take place, so that they would have some time to shake down into their places and improve on their previous training, I consider that they ought, to the utmost extent their civilian occupations will allow, to have been sufficiently trained previously in time of peace to take their place in the firing line at *short notice* (which I will take for this purpose to mean from seven to thirty days), because it is obvious that it would be disadvantageous to the community to take them from their civil duties, and so disorganise the business of the country (more especially as, besides being employed in all kinds of private firms—for the Volunteer net catches all sorts of fish—some of them are postmen, telegraph clerks, and fill various other public and semi-public posts), by calling them out before their services are likely to be actually required. The Volunteer, therefore, should be sufficiently trained (and while this applies to Volunteer regiments in all parts of the country, it especially, it seems to me, applies to those near the sea coast, particularly Artillery Volunteers) to be able at *short notice* to take the field in order to stop or check a landing force, and so give time to put in the field and concentrate a substantial or sufficient part of the defensive forces available in the United Kingdom, to meet the invading force. I am not a Regular officer and I am not a Naval officer, but I have tried to conceive a case in which Volunteers might be called upon to meet a foreign invading force. I apologise to Naval officers who are present if I am putting it wrong, but I presume you cannot land a lot of men from transports, even under cover of a fleet, unless it is at a seaport where there are deep-water quays, so as to bring them fairly alongside. Of course, no enemy would be so foolish as to land anything except a very large force, because he would have his retreat cut off by the sea behind him; but still I can imagine a case in which part of our fleet might be decoyed away to fight a foreign fleet, and another foreign fleet might cover a landing by transports of a sufficient force to be a very uncomfortable element in the United Kingdom. Then I think we Volunteers might do what the Duke of Wellington said must be done in 1804: we would stop the enemy landing if we possibly could, or if we could not do that, we would try and make it as hot for them after they had landed as we possibly could. I have tried to clear the ground, by these two considerations, for what really is the practical part of my paper.

### PART III.—TRAINING.

What, then, are the means by which the Volunteer can, in time of peace and in a commercial and busy country like this, be trained to become a fighting man and fit to take the field alongside of the Regulars at a notice of, say, seven to thirty days, if he is wanted? The problem

before us is to teach him as thoroughly as possible, in a necessarily limited amount of time, the essentials of his duties as an auxiliary soldier, without making it impossible for him to attend to his civilian occupations. I will take the old classification of the heads of his training in the sequence which, I believe, they are usually stated :—(1) Drill, including discipline ; (2) shooting ; (3) marching ; but in giving the following outline of training I refer mainly to the Rifle Volunteer, as I have no technical knowledge of the work of the other branches of the Force.

1. *Drill*.—The Volunteer is drilled both with a view to efficiency, and also for the purpose of being taught obedience to orders, that is to say, discipline. Lord Wolseley, when he presided here in November last, summed up very shortly what I am sure we all feel is one of the objects of drill : he said the first object was to learn the drill, but an almost equally important object was to instil discipline into the minds of a body of men. I, therefore, put drill a long way first. I will not labour that point any further. He must be taught to obey *to the letter* all commands when on parade, including that severe, although primary, test of discipline in a Volunteer regiment where members, as in the case of many regiments, rarely meet one another except on parade, viz., *absolute silence when at attention*. Military discipline cannot become a habit in a Volunteer in the same way that it does in a Regular soldier, because the latter is always subject to it and conscious of it ; while the Volunteer is subjected to it for but a very small part of his life, and is often an independent worker, who is not subject to the orders of any immediate superior, and is accustomed to act only in a manner that commends itself to his individual intelligence ; or he is a man who has made his own way, and thinks his own opinion at least as good as anybody else's. He must, therefore, be shown that obedience is necessary to the very existence of a military body, and he must be reasoned and expostulated with, and if he cannot be got to see the importance of it and to submit himself to it, he must be got rid of ; but this will not, I think, be often necessary, if he is properly handled and his officers are fit for their work. I admit frankly I have often asked myself, as captain of a company :—Would Volunteers do what they knew to be unpleasant, and thought to be unreasonable, when, as in the case of invasion would assuredly occur, they were tired out with marching, exhausted with want of food, and convinced that their captain or his superior officers were making blunders ?

I cannot altogether answer this. I think it would very largely depend on whether their officer had a personal hold over them, and a certain moral supremacy derived partly from his superior rank and uniform, and partly from his personal character and influence. As I said before, obedience would not have become a stereotyped habit with Volunteers as it does with Regulars ; but assuming that their officer was the right man in the right place, and really knew his work and his own mind, so as to be able to give his orders with decision and assurance, I believe they would then obey him and preserve discipline and order, more especially on occasions

when, as would be the case if called out for actual service, they would be acting with Regulars, and could not fail to be thoroughly in earnest, in view of the national state of feeling that would exist if invasion were even seriously apprehended, much more so when it was actually taking place. Hardly less important than the thorough efficiency of the officers is that of the non-commissioned officers, who are brought into more immediate contact with the men, and have, of course, not infrequently to supplement a want of knowledge in the men themselves; but, as far as my experience goes, I think the Volunteer force has, as a rule, efficient non-commissioned officers, and that they are zealous, anybody who knows their work, or has taken note of their keenness in connection with Volunteer Sergeants' Tactical Associations, will bear me out in asserting. I must say I think the Volunteer non-commissioned officer deserves the greatest credit. He does not get saluted by sentries when he goes into barracks, or by his own men, but he does a lot of hard work, and does not get any military title or anything of that sort for it. I think, then, that a precise knowledge of the necessary parts of drill must be, as it is always regarded, the first essential in the training of the Volunteer; of course, giving as little time as possible to ceremonial, but enforcing *precision* in all other parts of the Drill Book. Besides drill at headquarters in the evening during the week, we have in my own regiment found combined lectures and drill by the captains of companies to their men (and to any members of other companies who may be able to attend) an excellent way of teaching both the captain and the members of his company. I mean a lecture in which the first half-hour is devoted to verbal instruction and the black-board, and the second half-hour to doing in the drill-hall, or in summer out-of-doors, what the captain has verbally explained.

2. *Musketry*.—The difficulty of getting suitable ranges near large towns, where the greatest number of Volunteers are to be found, is so great—and, as the range of modern rifles increases, must become more so—that everything that can be done to make the Volunteer familiar, handy, and expert with his rifle should be done in the way of position and aiming drill, and shooting with the Morris tube, not as a substitute for, but as a preliminary and afterwards an addition to, shooting with the rifle at a range; although it is not by any means easy or inexpensive to provide and fit up a range where the Morris tube can be used.

In order to help and encourage Volunteers to go to the ranges when they have learnt the preliminary drill as much as possible, I think that the travelling allowance now fixed (Volunteer Regulations, 1895, Para. 556) at 4s. per man during the Volunteer year, in the case of every efficient member (the authorised range of whose company is more than five miles from the company headquarters), should be so increased as to put all corps on the same footing, and enable every man to go to and from the range by rail five or six times a year at least, *actually* free of expense *to himself*, or at any rate a sufficient number of times to complete class-firing; and that an arrangement should be made between the military authorities and the railway

companies, so that the former might obtain at a reduced rate railway tickets, *to be given free of cost to Volunteers* going to shoot at the ranges. The less well-to-do of the corps are at present at a great disadvantage, in comparison with the better-to-do regiments, in respect of practice on the ranges; and as free ammunition is already issued by the Government for the purposes of class-firing, I think a further concession should be given, and that arrangements should be made, not only for the ammunition, but for the issue by the authorities of free railway passes, on the production of a certificate from their adjutants to Volunteers going from the railway stations nearest to the headquarters of their companies to the ranges, for the purpose of using that ammunition; and that, if that were done, the present minimum of rounds required to be fired at a target, viz., twenty-one, if a man obtains 30 points in firing through his third class, should be increased to forty-nine rounds, the minimum number of rounds necessary to firing all three classes and becoming a marksman, or to sixty-three rounds if a man fails to pass his third class (Volunteer Regulations, 1895, Appx. VIII., Table B). While upon this subject, may I venture to express a hope that other corporations and local authorities will follow the excellent example of Nottingham in providing rifle ranges for the use of their local Volunteer corps?

Useful and necessary as individual target practice will always be, and difficult as it often is to get a team together at a range, I hope the day is near when prizes will be allotted in far larger proportion than at present to volley-firing and field-firing competitions. After all, individual target practice is only preliminary and a means to an end; and I think that the donors of prizes should empower the National Rifle Association, in some cases at any rate, to alter prizes for individual firing into prizes for volley firing, and that regimental and company prize money should be devoted to the same end. Do not misunderstand me. I know it is difficult to get a team together down at the range, but where it can be done I think it should be done. Lastly, I hope the day is also near when field-firing by a battalion will become part of the annual training of every Volunteer corps, but, of course, to do this there must be suitable ranges. I feel sure that much good will result from the work of the Field Practice Association for Yeomanry and Volunteers.

3. *Marching*.—I need not dwell upon this head of requirements for the Volunteer, because it is a subject which is attracting considerable attention, both in the Regular and Auxiliary Forces, but I think that at least two drills in the season should be in heavy marching order, and that a fair march should be taken to and from the actual place of the drill.

4. *Camps*.—Para. 273 of the Regulations for the Volunteer Force, 1895, provides that Volunteers shall be allowed once annually to encamp or take part in a marching column; and Para. 573 provides for the camp allowances that will be given for each unit attending the camp or marching column. There are two scales of allowance, *i.e.*, money payment, prescribed, to earn the higher of which an infantry battalion must attend the camp of its brigade, or a camp with the Regular forces with not less than 300 of all ranks; and a battalion, belonging to an infantry brigade, will receive

the lower scale of allowances for attending a regimental camp, but will only receive this allowance twice out of every three occasions on which it attends a regimental camp (except when allowed to do so under special circumstances), the object, of course, being to compel the attendance of the battalion at a brigade camp at least once in three years. Such camp is to last for not less than three or more than six days, and camp allowances will only be given for each completed day of twenty-four hours, unless the General Officer Commanding the District in which the camp is held certifies that a full day's military work has been performed in less than a completed period of twenty-four hours, and that no advantage would have accrued from the corps remaining in camp or on the march for the full prescribed period.

I ought also to add that, in addition to the camp allowance, a travelling allowance will be given once a year to and from camp under Para. 572 of the Regulations.

The Regulations do not make attendance in camp a condition necessary to earning the higher capitation grant; although Para. 229 of the Regulations points to the desirability of Volunteers annually attending camp by providing that, when a Volunteer battalion attends camp, any particular member of it unable to attend will, with the approval of the commanding officer, be permitted subsequently to substitute sufficient company for battalion drills, to enable such member to obtain a certificate of efficiency; and the point I wish to discuss is, whether such attendance should be made obligatory, in order to earn the full capitation grant, subject to the same exception as is made in case of non-attendance at the annual inspection, namely, special leave of absence, granted by the commanding officer, for reasons deemed adequate by him, or sickness duly certified.

In my opinion, there is the strongest reason for requiring the attendance of Volunteers of all ranks in camp, preferably under canvas, or else in barracks at a military station, for at least three days in every year; in addition, of course, to the usual company and battalion drills in the evening and on Saturday afternoons or Bank Holidays. In camp you get the full attention, time, and energies of the Volunteer. On Saturday afternoons he has generally done a hard week's work, and is to some extent tired or languid. You cannot teach him outpost or even sentry work, much less field work, such as digging shelter-trenches or hasty intrenchments, on an ordinary Saturday parade, held probably in a public park, when he has hardly time to give his mind and attention to his work and get into his stride, so to speak, before the parade is over. In the short days you have to drill as near headquarters as possible, so as to save daylight, and probably in a public park, or at best a common just outside a town, where movements are impeded by the public, and the surroundings do not suggest military conditions to the mind. No one, I am sure, will deny the great advantage derived by the Volunteer from attendance in camp, particularly with the Regulars; and the only question is whether it is possible to obtain their attendance in camp.

I will now read a very short paragraph on this subject from a letter

which is written by General Hutton, who commands some of our Colonial Volunteer brethren in the West Australian Volunteer Force. He says: "Since my arrival here I have initiated a system of annual field training for our partly-paid troops, whose organisation is practically identical with that of the Volunteers at home. The experiment has proved eminently successful beyond my most sanguine hopes. Officers and men have entered into the spirit of the training, and it has had a most beneficial effect. It necessitates company and regimental officers acquiring a good grasp of their duties, practically for the drill and field work of their men; and, theoretically, for the lectures they have to give in accordance with the syllabus. Non-commissioned officers and men are individualised by the system of training as given, the good being commended, the bad cautioned or discharged, and the dead-head is eliminated—that is, the man whose efficiency is equivocal is found out. At no time have, I believe, the regiments in this colony been so strong as they are at the present moment, nor has their instruction been so thorough, nor so many useless men got rid of." The syllabus provides for only four days' training in the year, the last day in minor tactics. I do not, of course, know the conditions of service in the Australian corps; I do not know what class of men compose it, whether working men who put down their tools for four days and take them up at the end, or whether they are in permanent situations; and I do not know what he means by saying they are partially paid. I cannot, therefore, deal with that any further, except to say that everybody here will be in sympathy with what General Hutton says if it could be done here, provided the Volunteer is able to retain his civilian employment, which is absolutely essential.

As I said in the first part of my lecture, the Volunteer is a bread-winner, and, as a rule, he certainly cannot take his holidays when he wants to. He is drawn to some extent, it is true, from the professional classes and clerks up to hundreds a year, and skilled artisans; while, on the other hand, there are what are called working men's corps. The Volunteer is not what is called in local Acts of Parliament a member of the "labouring classes," that is to say, a man who earns with his family less than 30s. a week, because he, poor fellow, cannot afford Volunteering, and has no place to keep his uniform or rifle, and so on; but the Volunteer is drawn practically from nearly all other classes of the community. He is drawn to some extent from the professional classes, but the point is this—that if he is drawn from the professional classes, or is a clerk, *i.e.*, a junior clerk in a bank or insurance office or a large commercial house, it is almost certain that he will not be able to take his holiday in the months of July or August or the first part of September, when his principals and seniors will elect to be away. I should rather like to test that question, in order to satisfy the minds of Regular officers. I should like to suggest that when men come for employment to the Army and Navy Stores, which is entirely directed by military men, they should do what they do on the Government railways in India—the directors should say to the man: "Yes, we will take you; but you must undertake, if you are physically fit, to serve in the Volunteers in our own or some other corps." If the men

in the Stores could not go out in August, and the military directors of the Army and Navy Stores would, I presume, be more inclined to indulge him and let him go than most other employers, that would give the directors some idea whether the ordinary Volunteer, not the artisan but the clerk, could get away. I have suggested that in order to test the question. To corps drawn from the great clerk class, which class has a very wide range indeed, clerks in commercial houses, banks, and so on, I am afraid attendance at Aldershot in August by any fair number of men from a regiment will always be (except, of course, in case of apprehended invasion) beyond their power, much as I, in common with other Volunteer officers, deplore it, because they could only do so without the leave of their employers, which would, of course, mean leaving their situations, and therefore be out of the question. On the other hand, Volunteers who are skilled artisans, and receive either weekly wages or are paid by piece work, can quite well absent themselves for a week from their work, and take it up again at the end of it; or, again, employers who are themselves Volunteer C.O.'s can take their men into camp with them. Corps drawn from this class, therefore, can, and should, attend Aldershot, or other standing camps, in July or August; but for the others, who are in permanent situations in commercial houses, Easter appears, I much regret to say, to be the only time when they can come out.

At Easter, there are four clear days in which, with some few exceptions as to the Saturday morning following Good Friday, business houses are closed, I mean, of course, Good Friday, Saturday, and Easter Sunday and Monday; so that by going down to camp, *e.g.*, at Aldershot, or into barracks on Thursday evening, and not returning until the evening of Easter Monday, the Volunteer can get four consecutive days' training. I believe this is the only time of year when *all* Volunteers can reckon on getting away for four days; but, inasmuch as corps drawn from the artisan class can get away in the summer months, they should attend Aldershot, or other standing camps, at that time; while I fear that, for what I may call the middle-class corps, Easter must continue to be the time for going into camp or, preferably at that time of year, barracks.

It may be objected that a Volunteer brigade may be composed of corps drawn from both classes, and that sending some out at Easter and some in August would mean breaking up the brigades; but this seems to me inevitable, if you are to get the whole Force into camp at some time once a year. And although I know some will object to forming your brigades on a sort of caste principle (the serious introduction of which would be hardly less objectionable than introducing political party divisions into the Volunteers), I see no remedy for it; and think it should be done, in order to secure the attendance of a brigade at the same time in camp under its brigadier.

I suggest, then, that attendance in camp for three days in every year should form a part of the training of Volunteer regiments; but this might, in the first instance, be relaxed so as to only make attendance twice in each period of three years necessary, in order that a Volunteer might earn the full capitation grant, and this rule should



be subject to the same exceptions as to leave of absence as are allowed in case of non-attendance at the annual inspection.

I would further suggest that a company of men, specially recommended by the captains of their companies, and approved by the commanding officer, should be given facilities for being attached to a Regular regiment at army manœuvres, a grant for proper expenses and rations, etc., of course, being given. I know that in one case a Volunteer battalion of the Hampshire Regiment did attend the army manœuvres in Berkshire, and did their work to the satisfaction of the military officers in command. I doubt whether every Volunteer battalion, as a whole, would be a welcome addition to a general's command at army manœuvres; but all Volunteer battalions could, I am sure, send one, two, or more good and serviceable companies to be attached to a Regular regiment for such manœuvres. The Volunteer Act, 1895, as I have pointed out before, provides for the services of a part of a Volunteer regiment being accepted for actual military service when the Militia is embodied, in which case they might form part of a Regular regiment, and what I now propose is a step in the same direction. I should reserve this honour only for men who are thoroughly efficient and serviceable—and as a recognition of their being so.

As Volunteer officers present know, at inspections everybody must be present who has not got special leave or a certificate of sickness, and under Para. 215 no inspection of a Volunteer corps can be held unless two-thirds of the corps are on the field. Of course, a good many cannot attend for various reasons. Sometimes they are sent abroad: it has often happened in my own company that clerks in houses of business in London have been transferred to houses of business abroad, and therefore could not possibly attend, and in such cases they get leave, and my suggestion is that attendance in camp should be put on the same footing as regards leave as attendance at inspections.

4. *Physical Examination.*—I am of opinion that every Volunteer, before he is enrolled, should be medically examined, and certified sound and fit for *moderate* military work. At present, the Volunteer Regulations (Para. 159) require that a Volunteer artilleryman must be 5 feet 6 inches in height, and have a chest measurement of at least 32 inches; and any other Volunteer must be 5 feet 3 inches in height, with the same chest measurement of 32 inches. I do not think this is sufficient, even if it is adhered to, of which I entertain considerable doubt; and although I do not think it is necessary that the examination should be as severe as in the case of the Regular, who may be sent to unhealthy climates, and have to undergo long periods of hard work and bad food and conditions in unhealthy climates, I think the fact that a man is a Volunteer should mean that he is a man of sound and good physique, and able to exchange sedentary occupation (which is what the Volunteer generally follows) for service in the field, without breaking down; and I think the medical examination might with advantage be repeated at the end of, say, every five or seven years, in cases deemed necessary by the captain or commanding officer. I do not believe the

Volunteer force would lose much in numbers by this, and it would certainly gain in public estimation and working power.

Lastly, and with a view to attaining the object of which I have just been speaking, namely, some guarantee that every Volunteer is physically fit to do in the field what may be demanded of him, I think that every possible encouragement should be given to gymnastic and athletic exercises. This is the more necessary, because, as I have just said, by far the larger number of Volunteers are engaged in strictly sedentary pursuits; and although the better-to-do members of the Force belong to football, rowing, cricket, and gymnastic clubs, there must be many corps whose members are not well enough off to join such clubs, and whose occupations (for example, that of a journeyman printer, watchmaker, or other similar trade), if not actually unhealthy, are far from conducive to physical development or condition. I think every regiment should have a school of arms and some gymnastic apparatus, besides, if possible, football or cricket clubs, and that more time should be given to physical drill and bayonet exercise than is at present the case. My own regiment happens to be composed of members who are well off, and we have a school of arms, a cricket club, a football club, and a swimming club; but, of course, I know all regiments cannot have similar clubs.

Before I conclude this, I fear, somewhat tedious and by no means original lecture, I will sum up the suggestions that I have to make to further improve what, I venture to think, results have already shown to be a *good system* of instruction for the Volunteers. My suggestions, which are of the nature of additions rather than alterations, summed up briefly, are as follows:—

1. That increased assistance, so as to cover actual expense, should be given to Volunteer corps whose members are compelled to go from their headquarters to their rifle range, either in the form of an increased travelling allowance, or by the issue of a limited number of free railway tickets (issued, of course, on the certificate of the commanding officer or adjutant), so as to enable members of those corps to travel to and from the ranges for the purpose of class firing really free of expense to themselves.
2. That greater encouragement should be given to volley firing by sectional or other teams, by allotting more prizes to volley firing in comparison with individual firing than is at present the case, either at Bisley or at regimental or company prize meetings.
3. That attendance in camp, for not less than three consecutive days in two out of every three years, should be made obligatory in the case of every Volunteer (unless prevented by sickness or some adequate reason allowed by his commanding officer), in order to enable him to earn the higher capitation grant. This arrangement would secure an average attendance, for three days in every year, in camp, of two-thirds of a regiment, subject of course to its reduction to, say, half, by leave of absence.

4. That in order that regiments, comprising Volunteer brigades, may attend camp at the same time, I would respectfully suggest to the military authorities a re-arrangement of the brigades, where necessary, so that each brigade may be composed of the regiments most likely to be able to attend camp at the same time, due regard being had to territorial considerations, *i.e.*, to each brigade, being composed of regiments belonging to the same town or district—subject however to this, to my mind, important qualification, namely, that while for brigade drills and in camp the brigades should be kept intact and under their brigadier, when engaged in a Field Day with the Regulars the brigades should be temporarily broken up, so that a brigade could be formed of, say, two Regular regiments, and one Volunteer battalion (made up, if necessary in order to secure proper numbers, as a provisional battalion) so as to allow a Volunteer battalion to be sandwiched in between two Regular battalions, in order to enable Volunteers to see how Regulars work in the field—and, in very fact and effect, to put them in touch with the Regulars. [Touch is sentimental and physical. Sentimental touch we already have with the Regulars, because they always act as good comrades to us when we go into camp. We want physical touch in the field.] These camps, whether regimental or brigade camps, should always be at or near Regular garrisons or depôts, and, if possible, standing camps—like Aldershot.
5. That from time to time, in order to give reality to their training (say once in four or five years), regiments should encamp in the neighbourhood of the position primarily assigned to them in case of invasion.
6. That one or more companies of specially qualified officers and men, to be selected or approved by the commanding officer of their regiment, should be allowed to be attached to a Regular regiment at army manœuvres, the idea being to encourage or reward exceptionally efficient men, and also to bring them into closer touch with the Regulars.
7. I would also suggest that Volunteer regiments should have provisional arrangements for the use of civilian wagons as transport (such as I, in company with other Volunteer officers, have seen used in the German Army manœuvres), which wagons should be registered at the headquarters of each Volunteer battalion for use when wanted. (They could not be kept at headquarters, because there is no accommodation for them.) They could then be requisitioned when required, as used to be done in the case of horses for the use of Fire Brigades.

8. That a medical examination of every Volunteer should take place on his enrolment and at the end of every seven years' service or at any future period when the commanding officer or captain of his company had good ground for suspecting that the Volunteer, however willing he might be in spirit, was not fitted to do a fair amount of active work in the field; and that every encouragement possible should be given to physical development by physical drill, gymnastics, and the establishment of regimental athletic clubs and inter-regimental athletic contests and matches.

In connection with this question of physical fitness, I would suggest that the age of compulsory retirement of the Volunteer (subject to the same exceptions, upon the recommendation of the commanding officer, as at present exist) should be reduced to forty-five; and that he should then, if he be willing, become a Reserve man under Para. 183, Sub-section 2, of the Volunteer Regulations, 1895. He would not, of course, be the only class of man in the Volunteer Reserve; because any man may on quitting a regiment, provided he has been returned efficient at least eight times in the annual returns of his corps, enrol himself as a Reserve man who would come out when he is wanted, and it seems to me that this is a particularly favourable time for doing this, because Major-General Lord Methuen, commanding the Home District, has issued arms for the full establishment (of what newspaper correspondents call the "war strength") of the Volunteer Regiments of the Home District, so that if you get your Reserve men you have your arms ready, and I think that what I am suggesting is a practical way of forming a Volunteer Reserve.

Finally, may I suggest that the total amount of the capitation grant and other allowances should not depend only on the number of efficient, but that where the regiment was a good one, and showed itself to be so at its inspection, some addition to the total grant might be made on the certificate of the inspecting officer? I know that this would involve considerable difficulty, but all admit the unequal *quality* of different Volunteer battalions.

At the present time a Volunteer regiment builds headquarters, we will say, at large expense. I know two instances in which it has been done—one a case of what is called a working-man's corps, and the other a middle-class corps; and the colonel has to pay interest on the money and to raise money to pay off the debt. The colonel very often does incur great pecuniary liability, and it is a great object to him to get every man he can, so as to earn a higher capitation grant. I think the present system of earning the grant might be modified on a certificate by the inspecting officer, who is usually the brigadier. On holding some of the inspections he might very well say: "This regiment has only 700 men, but they drill very well; they are an efficient corps. Their officers have got past the schools, they have passed in tactics, they have certificates of efficiency: the same thing with regard to non-commissioned officers. This corps is worth more than other corps. It is true, they individually get the higher grant of 35s. as against the

lower grant of 10s., but I think they are entitled to a little more." Allowance would, of course, have to be made for country corps, whose companies are scattered, and who have few opportunities of practising battalion drill, but I think you might have a scale of marks at inspection to meet this. For instance, we will say the maximum at drill for a corps in London with headquarters, centralisation, and so on, should be 100; the maximum for a country corps, with its companies scattered five, ten, fifteen, or twenty miles apart, would be 50, but the percentage of the 50 and the percentage of the 100 marks respectively given at inspection would show the relative value of those corps for drill purposes; and, in addition to the capitation grant of 35s. per head for the men, something might be given to a regiment as a reward for being an extra good regiment, so that the colonel should not be forced into trying to get every man he can into the regiment whether he is good or not. I hardly like to say that, but you understand what I mean. I think something might be done in the way I suggest. I am bound to say I should not much like to be the inspecting officer, but there are men who do not shirk responsibility, or even unpopularity.

I hope that these suggestions will meet with indulgent but candid criticism and discussion.

Lieut.-Colonel E. J. A. BALFOUR, 7th Middlesex (London Scottish) R.V.: I feel a slight difficulty in beginning a discussion upon this lecture, and that is the danger of trespassing beyond my limits (not so much in time as in matter); because the lecturer has alluded to two subjects which I feel, if they are once introduced into this debate, will make us wander far away from the main points. The first is the question as to whether we are to discuss an *ideal* condition of Volunteer law and organisation; the second is whether we are to discuss Naval strategy. I have seen both the first and the second of these elements of controversy hopelessly destroy proper discussion on lectures given in this Institution on former occasions. I myself think that the intention is that we should discuss entirely the constitution of the Volunteer force as it now is.

Major RICKARDS: No! My suggestions were as to status and training.

Lieut.-Col. BALFOUR: That involves the constitution—as it now is, and not as it might be. Taking it as it now is, the first point on which I wish to make an observation is the statement that the only force that can be applied to ensure Volunteer discipline is dismissal. I do not think that statement represents the whole truth. At any rate, it is incomplete. We have methods of fining, and we have methods of making things extremely unpleasant, short of dismissal; and I do not myself consider, in the several corps with which I have practical acquaintance, that anything further is wanted in the way of disciplinary powers than we already possess. The lecturer said he could not find an enactment giving effect to Volunteers being subject to military law when they are in camp with the Regular forces—he will find it in Section 23 of the Act of 1863. A suggestion was made that Volunteers might form *cadres*—I take it the real meaning of the word is skeletons—skeleton forces which might be filled up. But the first essential of the existence of a skeleton force is that there should be an ample supply of officers. The Germans have a number of trained officers and fill up the ranks. Our essential difficulty is the want of officers, and I do not see how we are even to begin to consider the constitution of great Volunteer Reserves in any form until we have not only got over the present difficulty of want of officers, but have also gone far beyond our present strength, and have registered a greater number of officers behind us

already trained. I do not want to enter into broad strategic questions of invasion. They should be left to the military authorities ; or perhaps Colonel Cave will give his views later on on the subject, in accordance with an admirable Essay of his which I have just read. A great deal too much, in my view, is made of the difficulty which would arise by taking away Volunteers from their civilian duties. Some time ago I took the trouble to make a calculation on this subject. The point was :—Assuming the Volunteer force were 250,000 strong, what proportion was that of the able-bodied men in the country between the ages of eighteen and thirty eight ? I found it to be about 3 per cent. It is quite impossible to believe, if one really realises that, that any serious dislocation of business would be produced by removing that proportion of the population from their civil employment. It leaves all the other ages free to take up their duties. On working it out, therefore, it would seem to be not nearly so serious as the epidemic of influenza two years ago. The suggestion was made that twice a year Volunteers should be practised in heavy marching order. Of course, it is extremely important that Volunteers should learn how to move in heavy marching order. But I do not think it could be taught in two days' work, as was proposed by the lecturer, and I am perfectly certain that those two days' work would be extremely unpleasant to the Volunteers. Also, they would not be a bit the better for it. You want, in order to teach men to march in heavy marching order, to lead up slowly and gradually to your result by weeks of training. I have, therefore, always set my face against my men being in heavy marching order at Easter, because, although they might have begun to learn at the end of those days to carry their packs, the moment they had learnt it they would forget it again—I mean physically forget it again—so that they would have to start afresh the next year. I think such an order would be an unnecessary worrying of the men. I was somewhat astonished at the statement made that there were no privates in the Volunteer force earning less than 30s. a week ; I know a good many country corps, and a certain number of London ones, and I think that is too high a standard. I know country corps of Volunteers who belong to exactly the same class as the Militia, with the slight exception that they have rather more permanent employment. In many parts of the country you find that the agricultural labourer is a Volunteer, and the dock labourer, of course, in London. The great reform that is wanted in cases of camps is the allowing Volunteers to earn the grant twice over if they attend twice. That would enable a certain proportion of those who attend at Easter to attend also at Aldershot. And I fail to see the principle upon which, because a man is in a position to attend a double number of days of training, that he should fail to receive the corresponding grant to cover his expenses. I think that is a fairly logical contention. In the London Scottish we have now for more than a year had a physical examination of every recruit ; the result has proved extremely satisfactory, in that a very small number have had to be rejected. I am certain that the examination is quite sufficient to enable the authorities to say with certainty that those men who pass it are fit for any amount of work they might have to do in this country. I do not think that a physical examination is as important, probably, in the Volunteers as in the Regular Army, for this reason—that in the nature of the case the Volunteer is a man engaged in hard daily work of one kind or another, and he joins the Volunteers, to a great extent, because he loves physical exercise. There is, in other words, a process of natural selection before the physical examination begins. I have only one other point to make. I wish the lecturer had touched upon a matter which I have had in my mind very keenly for some time, and that is the question of interior economy. We Volunteers have a kind of interior economy which is a mystery to most Regular officers—we understand it. On the other hand, the moment we were called out for actual work, their method of interior economy, which, alas, is a mystery to us, would have to be faced. And I shudder to think of the kind of confusion into which company

accounts would get, unless we were given some practice in time of peace. I think, Sir, that is a point which might be taken up by the authorities, and in which they might assist us. Although I have confined myself to a few criticisms of the lecture, I do not wish to be misunderstood. I have specially mentioned the points where I differ, but with the lecture as a whole I have the most complete and entire agreement.

Colonel T. S. CAVE, 1st Volunteer Battalion Hampshire Regiment: I have never been quite able to understand what the meaning of the status of the officers or the status of the Force was, but, so far as I can arrive at what it appears to mean, it is the estimation in which the Force is held by the public. I do not know how it is, but the public, though uneducated in military matters, seems to me to have a rough-and-ready way of getting pretty nearly to the truth in this matter; and I think that the status of the Volunteers, both officers and men, is very much in proportion to their military efficiency. If, therefore, we wish to improve our status, we must improve our efficiency; and there is just one suggestion now, I believe, before the authorities, which is, I think, a great deal more important than is realised. It has been put forward by the Institute of Commanding Officers that Volunteer officers should, when they are out for duty in camp, receive the pay and allowances of their rank. I should like to see it made a condition that pay was given to those only who have passed the promotion examination in tactics for the rank they hold. If the authorities were to make that rule they would then be really paying for increased efficiency. The other day, speaking in this place, the General Officer in charge of the Auxiliary Forces complained that a sufficient number of the Volunteer officers had not taken advantage of the privilege that was given them of going up to be examined in tactics. I should have liked to have said to him, had there been time, that that was because we cannot convince them there is any privilege in it; they think the boot is entirely on the other leg. But if the condition as to pay I have suggested should be made, as I hope it will, they would then realise there was some advantage in it, and I am convinced that the examination rooms would have to be enlarged for the next year or two. The other point which I should like to mention in reference to the paper is one which Colonel Balfour has already alluded to, and that is, the fallacy that exists in the mind of the lecturer, and I am sorry to say in the mind of the authorities, that the calling out of the Volunteer force would paralyse the commercial undertakings of the country. I have been rather more closely into the figures than Colonel Balfour. There was a return published in the *Volunteer Service Gazette*, which shows the exact proportion of the population that the 220,000 Volunteers make up—it is .7. Women and children are included in the population in this calculation. I have looked at the 1891 Census to see the number of men of a serviceable age in my own county, Hampshire; it is 171,000; there are 5,000 Volunteers, so that the percentage is roughly 3. Now to imagine that taking away 3 per cent. of men of a business age is going to paralyse the commerce of the country is exceedingly complimentary to the Volunteers, because it shows that their intelligence must be something like five times as great as that of the rest of the people, viz., those that are not Volunteers. Well, I am quite willing to accept the proposition that we are very brave fellows in our way, but I think it is rather too strong an order to suggest that so superior are we to the rest of mankind in general that 3 per cent. is sufficient to paralyse the whole business of the country. I am afraid that the authorities may perhaps put off too long the day of calling out the force. It is very important we should have as many days' and as many weeks' training beforehand as possible; and I hope that this Institution, through this lecture, and through any other means that may be at their disposal, will endeavour to convince the authorities that it is a fallacy to think that calling out the Volunteers would appreciably affect the Board of Trade returns, or that the Clearing House weekly account would indicate that the members of the Volunteer force had been withdrawn from their civil employment.



Colonel W. J. ALT, 22nd Middlesex (Central London Rangers) R.V. : I welcome the lecture we have listened to as a contribution to the legitimate agitation which I think is necessary to be carried on to convince the public and Parliament that something should be done to improve the Volunteer force, and remedy the weak spots in its organisation. I think there are one or two points in the lecture which indicate very great weakness in the Volunteer force. I lament that the lecturer's experience of the discipline of Volunteers forces him to take a very low view of it. I thought that talking in the ranks was a matter of ancient history, but the lecturer speaks of it being a severe test of discipline to maintain silence when at attention, leading us to infer that when not "at attention" silence need not be enforced. He further says :—"I have often asked myself, as captain of a company, would Volunteers do what they knew to be unpleasant and thought to be unreasonable, when, as in the case of invasion would assuredly occur, they were tired out with marching, exhausted with want of food, and convinced that their captain or his superior officers were making blunders?" and says he cannot answer the question. Well, Sir, unless the utterances of brigadiers and general officers who have commanded Volunteers in camp on very trying days at autumn manœuvres and at Easter in all weathers are very wide of the mark, I think that is a question which has already been answered in the affirmative. I consider that it is as high a test of discipline for Volunteers to submit willingly without complaint, and to the satisfaction of their military superiors, to the hardships they have to endure in all weathers at Easter and autumn manœuvres, as it would be when fired by the spirit of patriotism which would burn within them, to undergo not, probably, very much greater hardships in moving from point to point in the actual defence of their country. With these exceptions, I would briefly express my opinion upon the suggestions the lecturer has made. I hardly agree with my friend, Colonel Cave, that we can go here into the details of all the points which are raised. I would simply say, with regard to Nos. 1 and 2, I am in accord with the lecturer. With regard to attendance in camp for not less than three consecutive days being obligatory for the earning of the higher capitation grant, I say decidedly, No. With regard to brigades being reconstituted, I think that would be very difficult, and, indeed, hardly possible to be arranged. With regard to the suggestion that regiments from time to time should encamp in the neighbourhood of the position primarily assigned to them in case of invasion, I say most decidedly, Yes ; as also to the suggestion that "one or more companies of specially qualified officers and men should be allowed to be attached to a Regular regiment at army manœuvres." With regard to the suggestion that "Volunteer regiments should have provisional arrangements for the use of civilian wagons for transport," you, Sir, are aware that this is already being done in many regiments. With regard to medical examination, I am certainly in favour of this, and there are many corps now carrying it out. In connection with the question of physical fitness and the suggested age of compulsory retirement, I entirely agree with the lecturer. There is a large percentage of the 224,500 Volunteers who are returned as efficient who, by reason of age, are unfit for active service. If a medical examination were made compulsory, there should, undoubtedly, also be a limit of age for service with battalions when a great many bearded veterans covered with shooting badges, who come up at prize distributions, would be retired. Finally, the lecturer suggests that the total amount of the capitation grant should not depend solely on the number of efficient. I am entirely in accord with him there. I think with him that some battalions possess military qualities and qualifications which others do not, and it is not fair that we should all be judged by one hard-and-fast rule. It might be difficult, but I certainly think there are cases in which some battalions deserve more consideration than others.

Colonel L. J. OLIPHANT, Grenadier Guards (Commanding East London Volunteer Brigade) : There are one or two points I should like to speak

to. I think the lecturer, in taking seven to thirty days for mobilisation, is taking a good deal longer than the authorities would give him. As regards the question about discipline, whether the Volunteers "would do what is unpleasant," it seems to me we may be standing in a very false position. If there are a large number of Volunteers who have these ideas, and in whom the sense of discipline is so very weak, they would be a much greater danger to the country than the enemies they were sent to resist. With regard to the Easter operations, I was sorry to hear from the lecturer that it is impossible for a corps of the class he described to get out in the autumn. I think he takes a somewhat wide view of what can be done at Easter. He says there are four clear days' work. I think, from what I have seen at Easter, both as a spectator and as a brigadier, that if you can get two-and-a-half days' work, it is all you can get. There is a church parade on the Friday, and only an afternoon's work is done. You get a fair day on Saturday: you have church parade on Sunday, and on Monday we get a fair day—half-a-day, or perhaps three-quarters of a day—as the corps have to get back to their headquarters. Their time is entirely dependent on the time that the railway company will take them back. Very often they come back at a moderately early hour. I therefore think that, in giving Easter four days, you are giving it a very wide margin. We are told the Volunteers form 3 per cent. of the adult male population, and I cannot see that there is going to be that extraordinary disarrangement of insurance companies, banks, etc., where all these clerks are employed, if a few corps went to Aldershot in August. I have always maintained—of course I may be wrong—that if the employers are approached in a proper way, their sense of patriotism would be so touched that they would grant opportunities for their men to get out, and so good work would be able to be done, instead of what is, in many cases, only a sham. As regards the physical examination of the men, if it could be done, it would be an excellent thing; but the question is whether it would in any way damp the ardour of recruits joining the Volunteer corps, and whether there would not be a greater loss by men not liking the idea of being physically examined, with the chance of being rejected. That is a point to be considered, as to whether it would have that effect, by the commanding officers of Volunteers.

Colonel C. H. RUSSELL, late 14th Middlesex (Inns of Court) R.V.: There is one question (see Clause 4 of Major Rickards' suggestions) which the lecturer, whom I am glad to recognise as an old comrade in the Inns of Court, has raised, namely, that about camps. He advocates the closest possible association between Volunteers and Regulars, and he suggests—I think very rightly—that it would be of the highest possible value if, when field days are taking place and Volunteer regiments are present, even although they may be attending camp as a complete Volunteer brigade, they could be transferred to the Regular brigades. The lecturer speaks of this as a matter of opinion at which he has arrived, without having seen it in practice. I have seen it in practice. At the Autumn Manœuvres in 1871 was a brigade commanded by Colonel Stephenson which contained three Regular battalions, two Militia battalions, and two Volunteer battalions. The Volunteers were immensely benefited by working alongside the Regulars. Under such conditions they improve extraordinarily. I saw the experiment carried even further. One afternoon during the manœuvres of 1871, Colonel Anderson, commanding a battalion of the 22nd, took out three of the companies of his own battalion and three companies of Volunteers taken from a battalion in Colonel Stephenson's brigade (making six companies in all) in outpost duties. He broke up those six companies and reformed them, so that each company contained a half-company of Regulars and a half-company of Volunteers. The improvement in the Volunteers was perfectly amazing. Perhaps this particular experiment cannot be often usefully made, because I presume that now, as then, the Volunteer officers would have to fall out in order to avoid difficulties which might arise by placing them in command of Regulars. It is,

however, an illustration of the value of associating Volunteers with Regulars that I shall never forget. Then, with respect to the lecturer's remarks as to the times at which it is possible for Volunteers to attend camp, Easter is really the only time when the members of my old corps can, in any substantial number, attend. The ordinary Volunteer brigade time at Aldershot is the first week in August; that is within a fortnight of the rising of the Courts for the Vacation, when there is a special pressure of business, and at that time it is very difficult, if not impossible, that they can attend. I strongly agree with the lecturer in proposing that companies of Volunteers should be attached to Regular regiments for the purpose of learning camp duties and field work; and I should like to see that suggestion carried even further. I should like to see not only a company formed entirely from a particular battalion (which is what I understand Major Rickards to suggest), but a provisional company, so to speak, formed, say, of non-commissioned officers from different corps, or of privates from different corps. They would work well together, and if only the authorities would permit an attendance of that kind to count (for financial purposes) as attendances at camp, I think very great good would follow. The last point to which I wish to refer is transport. It is quite easy, at all events in London, to obtain from a competent person a contract to supply wagons, carts, and horses for transport. In 1888, I, on behalf of my battalion, entered into a contract (in form, practically, that which was suggested by the War Office) with Messrs. Seaward (the carriers) of Eastcheap. Major Prideaux-Burne, then our adjutant, and I went to Seaward's yard and selected the wagons and carts, and on each of them was placed a brass label containing the letters "I.C.R.V." (indicating the regiment), and the number of the particular wagon or cart, and a list of the wagons and carts, with their denoting numbers, was scheduled to the contract. I have frequently seen those wagons going about London, recognising them by these brass labels. I do not know what arrangements with reference to transport have been made by the military authorities, and whether transport for Volunteers and contracts made by them are included or taken into consideration. If they are not, I think that there might be a danger of some overlapping between the Regular and Volunteer arrangements; but no doubt that could be easily avoided (if, indeed, it has not been already dealt with) by the officer responsible for transport. Colonel Oliphant remarked upon the short time that is given at Easter for useful work. Cannot this time be enlarged by omitting from the programme the march past on Easter Monday? I know that there are considerations, not military considerations, which may have led to the march past being retained. If the town to which the Volunteers go puts its hand into its pocket (perhaps deeply) for the purpose of providing accommodation for the Volunteers, it may not improbably desire that, in return for this expenditure, it should have something of a military pageant. But if it were suggested to the authorities of that town that not only would it be in the interest of the Volunteers that the time devoted to the march past and to the preparations for the march past should be given to manœuvring, but that a far more interesting sight would be offered to the spectators by the mimic war being fairly fought out, surely it is not unreasonable to expect that they would accept, and indeed cordially welcome, the change.

Colonel LONSDALE HALE, late R.E. : I wish to express the deep gratification which I have felt at finding that a Volunteer should come here and be the pioneer of a movement for the classification of the Volunteers, a thing that I have always persistently advocated. Major Rickards has done it in the most delicate way possible, but has at the same time indicated his opinion that the classification is desirable. The lecturer also says practically, "Let us give to the pick of our corps the training with the Regular troops." By all means. We shall be glad to get them. Send your companies; whatever you like—you are sending your best men, we are getting the cream of your corps; your officers who know their work, your officers who can command their men and will deserve the respect of their

men, will join these regiments; they will be known and identified, and we shall get what is absolutely necessary—classification of the different units in the corps, and of the different companies in the battalion. There is only one other remark I wish to make—and that is with regard to these brigade camps, on which so much stress seems to have been laid. I do not mind speaking of the brigadiers in the presence of our Chairman, because he happens (he will forgive me for saying so to his face) to be a singularly good brigadier of Volunteers. I have watched Colonel Sterling as commander of a brigade, and he knows how to teach, and he teaches the Volunteers what they want. But going to a brigade camp does not secure that. I have seen Regular officers' dead failures as Volunteer brigadiers, men who have not the slightest notion of how to teach, men who do not know what to teach. That is the one other point which strikes me with regard to this brigade camp work. We do get battalions of different degrees of efficiency in the same brigade, and the brigadier puts them all to the same work. Some battalions want to be taught the elementaries; other battalions in the brigade know a great deal; but, from having seen a great number of brigades at such work, I am quite certain that uniformity of teaching for the different battalions is very often a mistake.

Major A. G. RICKARDS, in reply, said: I have detained you so long that I will not keep you many minutes by any remarks in reply. First of all, I do feel most strongly—although I know Colonel Alt did not mean it personally—that I should to some extent have been made responsible for saying what I never meant to say—that I doubted the discipline of Volunteers under stress if they were properly commanded. I never meant that at all. What I have tried to do is rather to under-state than over-state my case, and as far as I can, to fairly face the problems before us and come to close quarters with them. I rather felt what was said by Colonel Alt, and also, I think, by Colonel Cave, implying that I did not believe in my men. I do believe in my men; if I am fit to command them. I wish to say that I have a high opinion of the Volunteers, but, like all other troops, and untried troops especially, they must not, when they are putting on their armour, boast with the Regulars that are perhaps taking it off; but I want to look the question fairly and squarely in the face. I hope you do not think I am the less a keen Volunteer, or the less a believer in the Volunteers, because I try to test the case by looking at things clearly in the face. So much for my personal feelings in the matter. I do not think I need go very much into detail, if he will forgive me for saying so, as to what Colonel Balfour has said. He thought I had failed to understand that there are many men earning less than 30s. a week in the Volunteer force. I did not mean that at all. Of course, there are clerks earning 18s. or 20s. a week, but in Acts of Parliament, which I have to draw sometimes for taking property in towns, there is a certain clause called "Displacement of the labouring or artisan classes," who are there defined to be men who, with their families, are earning less than 30s. a week, *e.g.*, a navvy and his family. That is the man I was alluding to. Do not think I was alluding to him disparagingly, but I was trying to show that we had not to deal very largely with that class of men. I hope there are such in the Volunteers; I hope the Force embraces all classes. I most heartily agree with Colonel Cave in trying to make the Volunteer officer pass the Tactics Examination. As to the four days at Easter, with great respect, I think, Colonel Oliphant has undervalued them; and, with regard to disorganising the business of the country, I must confess I did put that a little too high. I had really in my mind disorganising the business of the Volunteers, and what I meant to say was there are a great many men who cannot go out. I know how I gave rise to that to some extent, because I quoted the case of postmen and telegraph men, and so on. I was rather bearing them in mind than the average Volunteer; therefore, I wish to modify what I said about them. I did not mean that it would disorganise the business of the country, because it would not; there are plenty of others to take their places; it might disorganise the Volunteer, and lead to his losing his

situation, which would be a pity. I do not really think I need detain you any longer. I am much obliged to you for having listened to what I had to say.

Colonel ALT: I had not the slightest intention, in the remarks I made, of reflecting upon the lecturer, but merely wished to testify to my belief that the Volunteer, in whatever circumstances he might be placed, and whether the officer in command at the time was a particularly smart man or not, would not hesitate to obey the orders given, whatever the consequences might be. That is all I meant.

THE CHAIRMAN (Colonel Sterling): Gentlemen, it has been my lot to occupy this afternoon a position which I wish Sir Francis Grenfell had been able to fill, as it is his special care to watch over the interests of the Volunteer force, in all its ramifications, and, as he is in touch with headquarters, it would have been specially advisable that we should hear their views explained. In this theatre, and in its predecessor, we have seen thrashed out many questions. Crude ideas have been here brought forward, which crude ideas, if they have failed to withstand argument, have been sent to their proper resting-place. We have also here had very important ideas brought forward which have been the better for being canvassed and talked over by able and intelligent men, and, above all, by people enthusiastic on the subject which may have been brought forward. When accepted, their suggestions have received a mint-mark of incalculable value. Here we are face to face with the fact that the Volunteers in this country are accepted as an important integer in its defences. There are enthusiasts who ride a good horse to death; one class who say that we want hardly any fortifications, hardly any soldiers, and that the whole question of the country's safety is one for the Navy. There are others who, up to a few years ago, said the Navy was not all-important, and that we must have large military forces. We have even seen eight Army Corps mentioned in the Army List. But there is a middle view that has now come over reasonable people; and, although it is admitted that a large Navy is of first importance, it is scarcely deemed of less importance that there should be fighting land forces, to be thrown wherever necessary, and that, with a small voluntarily-enlisted Army, such as we have got, a great body like the Volunteer force might, in the event of necessity arising, make all the difference to this country, by its existence or by its non-existence. This being the case, of course all matters of preparation must be done in ample time. It was only the other day I had to examine the question of a much-discussed point in a speech of President Monroe's, made on the 2nd of December, 1822, which has now come to be known as the "Monroe doctrine"; but in his inaugural address, on the following day, he made a statement which is apt to any country at any time, and especially apt to this country at this time. He said, "It has often been charged against free Governments that they have neither the foresight nor the virtue to provide at proper seasons for great emergencies; that their course is improvident and expensive; and, whatever may be its calamities, that its terrible warnings will be disregarded and forgotten—as soon as peace returns." Peace, as far as this country is concerned, has returned for this generation up till now: that is to say, we have had no struggle for national existence. We have had foreign over-sea expeditions, but we have never known the curse of war on the soil of this country, and it is only by the resolution of our fellow-countrymen that they will make their forces effective in peace-time to prevent this, that we shall be enabled to keep the curse from us for ever. I, of course, cannot in my place as chairman deal with the somewhat conflicting views brought forward by the Volunteer officers who have spoken, but the fact remains we are taking stock of our forces, and none too soon. Every point of preparation that is to be effective in war must be cultivated in peace, and must be in working order long before the necessity for its employment arises. Every war-ship goes through her trials, the vessel, the guns, the engines, and the crew, before being sent on her mission; it would be well if we could, in the same sense, test the

mobilising power of the Volunteers. As to their fighting power, with only moderately good command, I, as an Englishman, have little distrust. We have seen that the fighting power of the race has not diminished when it is well handled, but we have also seen that the effectiveness of that fighting power is much diminished when men, however individually gallant, are put into the wrong position. I congratulate you, Major Rickards, on the skill with which you have drawn up a most interesting paper, and I think the recorded notes of this discussion in the JOURNAL of this Institution will be of value, as showing the intense interest that many Volunteer officers, of responsible position, take in the question of the due previous preparation for the wars or trouble into which, at any moment, the country may be launched.

## NAVAL ESSAY.

*(Honourably Mentioned.)**Subject :*

"IN VIEW OF THE CHANGES WHICH HAVE TAKEN PLACE IN THE COMPOSITION OF FLEETS DURING THE PRESENT CENTURY, WHAT SYSTEM OF ENTRY, TRAINING, AND DISTRIBUTION IS BEST CALCULATED TO ENSURE AN EFFICIENT BODY OF OFFICERS AND MEN OF ALL BRANCHES, FOR A PEACE AND WAR ESTABLISHMENT?"

*By Captain J. M. ROSE, R.M.A.*

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"L'adresse surmonte la force."

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## INTRODUCTION.

IT must ever be a source of congratulation to an Englishman that our Navy can still, after two centuries of fierce competition, lay a not ill-founded claim to the leading position among the fleets of the world. We may not have as many ships as the protection of this great Empire demands, and it is generally conceded that we have not enough men, yet there is no one Navy which we can take as our copy and guide. We lead—and for us to keep ahead is the great necessity of our national existence. This position can only be maintained by repeated efforts, and the ever-recurring necessity for change is our greatest difficulty. Our Navy has been made what it is, only by constant trial and vast experience; our present ships with their crews are the successive evolutions from ancient types; and only on a similar principle can a *personnel* for a Navy of the future be constructed.

It is easy for the theorist to create new and superior systems, but the practical reformer having more difficult material than pen and paper to deal with, cannot lightly destroy existing matter, and begin afresh to suit each varying circumstance; for, to commence with, he has that great giant "Vested Interests" to deal with. The professional life of a naval officer lasts for over thirty years, and that of the seaman for twenty;



therefore it is ordinarily impossible, with justice to all concerned, to at once eliminate any particular line, or to greatly vary the conditions of service of any class, unless such change is undoubtedly beneficial to all concerned.

Even though it is clearly for the national welfare to greatly reform any particular branch, if the present class cannot be readily merged in the new departure, it must be permitted to die out, and this is probably a matter of long years, as for example the departing Navigating line; and should one propose to do away with the Accountant Branch, this could scarcely be done with exact justice till the youngest clerk had reached the age for honourable retirement; and the merging of the two branches of the Marines may not be equitably carried out till the latest joined subaltern has attained the rank of general officer.

Moreover, much wisdom has been expended over our present systems of enlistment, instruction, and administration, which might be entirely lost by sudden change, and all existing official books would require recompilation at an expense of many years of blind groping for best results. In fact, in a Navy like ours, gradual reform is the only practical method, for there must never be a moment when our first line of defence as a whole is not ready for war. Yet to stand still is impossible, or we shall be passed by our rivals in the race for efficiency. For these reasons, the first part of the Essay will lay down systems for the formation of corps to man a Navy of the present and the future; that is, to answer the question of the Essay, with little regard for existing institutions and classes and opinions. This is the paper *personnel* of the theorist. The second part will show how our arrangements might evolve, so as to reap some of the advantages claimed for the systems laid down in the first.

The general tendency of evolution may be obtained by glancing at "the changes in the composition of fleets during the present century," and their consequent effect on the crews.

1. The motive power has now entirely altered, and sails have been gradually and entirely replaced by steam. Nowadays sails are only employed for training purposes (and in a few small craft on distant stations), and the vast majority of ships-of-war have lost their masts and yards. This has produced the following great changes in the composition of their crews:—

- a. The necessity for training and embarking a highly-trained and scientific body of Engineer officers, who were entirely unknown in Nelson's time.
- b. The introduction of the engine-room artificer and stoker class.
- c. The diminishing necessity for seamen skilled in work aloft, and the disappearance of sail-drill as a necessary exercise for the seaman.
- d. Lastly, a considerable diminution in the necessary numbers of the complement in proportion to tonnage for the actual working of the ship, as in our later vessels steam and machinery are not only used for the main propelling force,



but also to do a great part of the heavy work on board formerly carried out by manual labour. Thus in our first-class battle-ships "the auxiliary engines number some seventy of varied and diverse mechanism, worked some by steam, others by hydraulic power."<sup>1</sup>

2. The great changes in armament of our battle-ships, the diminished number of guns, and the fewer number of men required to work them. With regard to the actual numbers, different types vary considerably, and more guns are carried now than was the case a few years ago; but in the same period the number of men required to work them has greatly decreased, for the first turret-ships required fifty men to work the turret ("Thunderer"), while the 67-ton guns of the "Royal Sovereign" class only require ten men per barbette. But a first-class ship of the line in the beginning of the century, and up to 1860, carried 120 guns, requiring an average crew of ten men per gun; while a modern battle-ship, say the "Royal Sovereign," carries only fourteen heavy guns, with a crew of some eight men per gun. However, to the modern totals must be added very large parties for magazines and shell-rooms, and supply of ammunition generally (a constantly increasing task as accurate fire becomes more rapid); the numerous crews for small Q.F. and machine-guns, and the crews for torpedo-tubes, which necessitate the training and embarkation of another specially-trained class. It must also not be forgotten that, while the amount of machinery and mechanism connected with the armament lessens the manual labour, it at the same time necessitates a vastly increased training for the gunners, and also adds greatly to the work of the engineer staff.

Before passing on to administrative changes, it may be as well to summarise the effect of those already mentioned in shaping our crews. They are in the main :—

- a. The replacing of a large part of the complement of real "sailor men" by a new class—stokers and engine-room artificers—officered by skilled and highly-trained engineers.
  - b. Even the existing seamen have greatly changed functions, for they are employed principally in working complicated machinery, so that both for seamanship and gunnery a careful study of mechanism must replace much of the old training in working ropes, tackles, and spars. In fact, they are becoming highly-disciplined mechanics, trained in their boyhood to be seamen, but whose after-fighting education greatly follows on military lines.
3. The general spread of science, in making mobilisation more rapid, organisation more complete, and armament more deadly, will probably so shorten the duration of future campaigns, that it is necessary for us to be able, on the first alarm, to collect a force superior to that of the enemy, and to have a large Reserve to fall back on in the near future. Moreover, the greater our numerical superiority in

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<sup>1</sup> "The British Fleet," p. 310.

the first brush the cheaper for us will be the campaign, the less necessity for the employment of doubtful Reserves, and the greater hope of preserving our trade and national existence.

In the past it has always happened that the war has lasted long enough for us to fall back on our national untrained Reserves, that is, our merchant seamen and others—"land-lubbers"—who have been trained and made efficient during the progress of the war, for the press-gang by no means swept in all seamen; while the marines, totally untrained in seamanship, have always formed an essential portion of the crew. The future, however, does not promise to allow us time for this, and the high training required for the fighting man of the present day cannot be imparted in the short time likely to be available before the crisis arrives. Luckily, no change has impaired the value of the marines, for they do receive an efficient fighting training, and seamanship is only required from a still smaller portion of the crew.

As regards the Reserves, there is also the serious consideration that although the tonnage of our mercantile marine exceeds that of other nations by more than it did in the time of the old wars, yet the progress of mechanical invention has so reduced the complements of merchant ships that the same proportionate number of seamen do not exist. Unfortunately, also a large proportion of these reduced crews are foreigners, who would not be available for manning the fleet in any case; so that it becomes a question whether, even given the necessary time, we should be able to find seamen in sufficient numbers to man our fleet when placed on a war footing.

The great progress of organisation abroad also necessitates a corresponding change in our Navy, as foreign authorities, owing to the principle of universal service, can call on the whole of their seafaring population to man their Navies; thus being able to train and pass into Reserve a very great number of men in proportion to their ships. They have, therefore, placed us, in respect of a Reserve, at a great disadvantage; and since it is generally conceded that our strength all round should be equal, if not superior, to those of any two Powers, this evidently entails a great strain on our voluntary recruiting resources. In the early part of the century and previously, we were able to obtain sufficient numbers (at one time as many as 150,000!) by means of the press-gang, and by offering high bounties for volunteers. The press-gang can never be revived, as it is unsuitable to the spirit of the age, and the other method is not rapid enough in its working, and too costly. Besides, the men, to give us full value for our money, require to be highly trained in time of peace, and the sweepings of the gaols and streets are hardly suited to work our modern machinery!

To ask that our numbers under a voluntary system should equal those of the two strongest Naval Powers, is to place an unnecessary strain on the Estimates; but we can afford to have an adequate number of more highly-trained men. France alone has an active force of about 40,000, with a more or less trained Reserve of 100,000; a total we cannot now approach. During the last year we actually had available for sea service 72,865

including Coastguard and Marines; and to this total we might have added 24,191 in the Royal Naval Reserve, and 4,385 of the Pensioners' Reserve, giving 101,441. The numbers voted in the Estimates have, however, been increasing for several years, and a slow progression towards national preparedness is being continued.

But the real, practical question for solution is, how to enter, train, and distribute enough men to give us sufficient crews for all our ships on the order "Mobilise," and to arrange for a further supply to replace casualties. Estimates given by well-known writers<sup>1</sup> place the number to man all those ships which we may require for war at a total of some 100,000 men; and judging from the experience of the past, and the conditions of the present, at the end of three months of war we should require a reinforcement of 25 per cent, and so on at this rate for the whole of the first year, till the total had reached 200,000.

It is also necessary to arrange for a supply of highly-trained officers, and at the present moment more watch-keepers and more engineers are urgently needed; while the Royal Marines are very much under-officered, as judged by our Army proportions. The question throughout is complicated by the different conditions of service and training required, and by class differences generally.

The active forces are thus divided:—

Seaman class and boys approximately 30,000 or 43 per cent.

Engineer Branch " 17,000 " 24 "

Artisans and miscellaneous ratings " 8,500 " 12 "

Royal Marines " 15,000 " 21 "

Completing the heterogeneous mass of which the Navy *personnel* is composed are several classes of Reserves. These varied forces illustrate the great difficulty under which an essay-writer belonging to a particular branch of our Navy labours, for it is easy to produce arguments which would satisfactorily prove (to an engineer) that the Engineer and his staff are the first consideration in any Navy, for is not mobility the most important essential of both tactics and strategy? Similarly, a Marine might be persuaded that he could dispense with the Seaman entirely, and unaided perform all the deck and combatant work, and so on through all branches. Yet, for the Service at large, the view must be a broad-minded one, which shall comprehensively take in all sides of the class questions. And an important step in the formation of a new Navy corps would be to combine all these interests in a single homogeneous body of men—separated only in their work, not by their organisation: a happy conclusion, but by no means easy of attainment, and certainly not to be achieved by a few happy arguments.

However, a writer who would try to combine all interests in his work could scarcely fail in producing a lukewarm contribution to literature which would fail to convince any branch at all. Thus, if anything in the following pages hurts the *amour propre* of any particular line, or, if the

<sup>1</sup> Lord Brassey's "Naval Annual, 1895," chap. ix.

"The New Review," April, 1895, p. 377.

arguments fail to convince, may it not be because one brain cannot at the same time grasp all conflicting interests? Finally, the author's sole idea is to aim, narrow-mindedly perhaps, at the welfare of the Navy and the improvement of our first line of defence, believing also that to achieve any great result a species of narrow-mindedness is essential! This is his first and last apology.

## PART I.

### THE PERSONNEL OF THE THEORIST.

#### THE THREE ARMS OF THE SERVICE.

Now, supposing it were possible to begin again and build up a British Navy on a new system, how would it be best to proceed? The numbers required would be about 100,000 of active force, with a Reserve or reinforcement of about the same strength, to be available during the first year of war; how at the least cost could we raise these numbers, make them efficient, and best distribute them to serve our great purpose? What we require in point of quality is:—

1. Material from which to draw highly-trained and duly-qualified strategical and tactical leaders to manœuvre our fleets and ships to the best advantage.
2. A highly-trained staff to aid these commanding officers, to spare them from details of administration, which only hamper and clog the brain of a leader; to collect intelligence, to carry on ordinary official correspondence, to study law, and to keep accounts.
3. Specialists, with a deep insight into naval architecture, engineering, gunnery, torpedo, and navigation, respectively.
4. A large body of officers, whose main duty will be the subordinate command of men and ships; who, in fact, under the preceding classes carry out the executive work of the Navy; these will require, in addition to the ordinary education and instincts of a gentleman, a good knowledge of most of the branches of work just alluded to.
5. Men to form the rank and file, and, who, with the preceding class, may be divided into three fairly distinct bodies or corps according to the work each has to perform in the general plan:—
  - a. A Seaman Corps to man the boats, work cables, steer the ship, heave the lead, refit rope gear, work hawsers and anchors if the ship gets ashore, etc. The officers of this corps would provide navigators and officers of the watch. The men would be specially trained in their duties from boyhood, and the whole would be disciplined to fight with the different weapons carried on board.
  - b. A Marine Corps to perform the military part of the work, man the guns, do the guard and sentry work duties, and, in conjunction with the last class, carry on the deck duties generally. The officers of this corps would provide most of the specialists in gunnery and torpedo.

- c. An Engineer Corps, not only responsible for the working of the engines forming the actual motive-power of the ship, but also for much varied machinery connected with deck-working and safety arrangements, with electric lighting, gunnery, torpedoes, and navigation. In addition should be attached to this corps all artisans employed on board in work connected with construction or mechanism.

6. Medical officers and their assistants will be required, and certain other classes who could be selected from or attached to any of the preceding corps for administrative purposes.

Classes 2 and 3 would be selected from the best men in class 4; while similarly class 1 would be chosen from 2 or 3 as might be required. The method of selection requires fuller explanation to be given later.

As regards 4 and 5, which include the vast bulk of the officers and men of the suggested *personnel*, they would be so incorporated that the three bodies, though quite distinct in organisation, would work side by side as in the Army do the cavalry, artillery, and infantry; they would, in fact, form the three arms of the Naval Service. As for the question of precedence, so important in fact, so unimportant in theory, the Seaman Corps would naturally come first, the Marines next, and the Engineers last, but in each corps the rates and opportunities of promotion would be equalised as far as possible, and officers and men would rank and command one another according to seniority in their respective grades, thus removing the grievous class jealousies which now exist, and there would be no "Civilian" borne in the fighting machine. But the question of supreme command of fleet or ship requires special arrangement.

The organisation of each corps would be made as similar as possible, and all its interior economy and training would be supervised by its own officers, who, however, in their own specialities would be able to command men of the other corps; for example, Marine officers could command seamen at infantry, musketry, or gunnery drills, and Engineers the other branches when aiding in machinery and construction work. Thus in a large ship the captain would have under him a staff composed as follows:—

The Chief of Staff, or "Executive" officer, with perhaps navigator and first lieutenant, according to size of ship, would form the (A) Staff, which would be responsible for the Seaman class, navigation, evolutions, and the general order of the ship, but would interfere as little as possible with the interior working of corps. Succession to command would rest with these officers alone.

The senior officer of Marines would command the Marines, and serve as Staff officer for torpedo, gunnery, musketry, and infantry training.

The senior engineer would command the Engineer Corps, and be responsible for mechanism and construction.

The (B) Staff would consist of one or more officers for office duties, replacing the present accountant line. In addition, there would be the senior medical officer, whose functions would remain as at present, except that he, too, would no longer be a "Civilian," but a "Staff" officer.

An admiral commanding a fleet or port would have a Staff formed on similar lines to assist him. The Board of Admiralty would also be formed on similar lines, but of this, and of the duties of the Staff generally, and their training, more details will be given in the proper place.

As regards the (A) Staff officers, to-day as in the past, it is necessary that the commanding officer of a large ship or fleet should be a comparatively young man, for much nerve, enterprise, and endurance are required. Hence he should be early promoted to his position, and therefore some system of selection is necessary. The method proposed is that no officer should be appointed to the (A) Staff until he had passed for promotion after a special course of administration, strategy, and tactics.<sup>1</sup> On completion of the course, officers would be granted first or second class certificates according to merit, but the standard should be a high one, so that only those who show considerable intelligence and application would be considered qualified at all. The work, however, should be as practical as possible, including the actual superintendence of target practice and the handling of ships of all kinds at steam tactics. Officers to go through the course at any time after two years' service as lieutenant in a ship-of-war at sea.

No officer who had not passed through the course could hope to command a large sea-going ship or fleet, but might be promoted for navigating duties, if qualified for first-class ship, or might command a dépôt ashore; but to this rule an exception might be made for distinguished war service. All instructors of the Seaman class, whether of gunnery, torpedo, or at the college, would also be required to qualify. On appointment to a ship as "executive officer," an officer might at once be given a step in rank to make him second in command, if this were thought necessary and he held a first-class certificate. On promotion to commander, it is recommended that the best officers be appointed to Whitehall for further practical strategical and administrative instruction under the Chief of Staff or intelligence departments.

In this way not only would the hardest working and cleverest officers be pushed to the front, irrespective of "paintwork," but also it would raise the level of technical study throughout the Navy. Fitness for the higher commands depends on such a variety of causes, and generally so much more on character than on education, that it would be impossible to decide from the course alone which were best fitted; but officers would be equally judged by their practical work on the Staff. Certainly, however, education given to the boy alone does not fit him for high responsibility, but requires supplementing by instruction to the young officer of some experience in his profession. Yet the man to command should not be too much of a specialist. Men, administration, the habit of command, tactics, and strategy, are his proper studies, and these should be practised and worked up in early manhood, before the brain becomes crystallised. Specialist work should be left to Staff advisers, for it is

<sup>1</sup> By the word "tactics," often used in the essay, is generally meant all that appertains to fighting a fleet or ship in presence of the enemy, namely, manœuvring of every kind, and the use of the ram, gun, and torpedo.

impossible that any one brain shall at the same time be efficient and up to date in all branches of scientific fighting required in the modern fleet. If the commanding officer, in addition to the necessary personality, has acquired a practical knowledge of the five subjects just mentioned, and knows how to use a trained staff, that is all that is required, and more than will be generally obtained !

#### THE (B) STAFF.

In the new system there would be no accountant line specially entered, but each officer of a unit would pay his own men, aided by a writer or petty officer of the unit, and would also attend to clothing, etc. However, to each ship an officer would be appointed for charge of ship's stewards' stores, office work, and to check accounts. In ships of the largest classes this officer would be a Staff officer (B) who would have permanently given up his own line of work to take on office duties, either because he had no chance of promotion in his own corps (though still a moderately able and efficient officer), from liking for the work, or because of some physical disability for anything but office work. He would be selected from any corps indiscriminately, would be highly paid, but would give up all chance of promotion in his own corps, his only hope of advancement being as (B) Staff officer to an admiral or at the Admiralty. The advantages claimed for the scheme being, that accountant work is well within the capacity of any educated man, and that in a fighting machine it is better that each officer should have received training which will make him of the highest value in war ; that many officers are required in the junior ranks (lieutenants, etc.), for whom no future in the fleet can be provided ; while as paymasters they will receive adequate remuneration and a reward for their early service, instead of being dismissed to a forced retirement on shore ; lastly, the technical work is so safe to-day in the hands of the highly educated writers, stewards, etc., that all that is required is a responsible head, and to carry and train young commissioned officers for the work is an extravagance. In small ships the office work could be carried out by a young officer of any corps in addition to his own work, the extra pay being an inducement that no *poor* officer would refuse. Warrant officers would also frequently be available for the duty, and it might be a possible solution of one of the difficulties of the day if a few warrant officers were given commissions on the (B) Staff.

In defence of carrying "civilians" on board, it is always urged that plenty of work could be found for them in action in looking after the wounded, supply of ammunition, etc. The reply is, that it is better even for this class of work to have men properly trained for the duty, and it is surely better that every man should be a possible *trained* reserve for the emergencies of action.

#### THE ACTIVE LIST.

If to arm all our ships for war requires 100,000 men, then the *personnel* of the three arms (with the miscellaneous ratings attached to the Staff) should not be laid at any less total, for, although every ship may not at



once be commissioned on the telegram "Mobilise," yet a large number of the *personnel* also will not be forthcoming, as the total must include staff at the dépôts, sick, etc. The programme can scarcely be called too expensive, for with voluntary service the national security cannot be more cheaply guaranteed. It cannot be too strongly urged that no men should be counted on for the first effort who cannot report themselves on board within forty-eight hours of receiving the order, and that, therefore, all Reserves, except half the Coastguard, should be put outside the computation. Moreover, every sort of Reserve will be so valuable later on in the campaign, and will be so much improved by a few days or weeks of dépôt training, that to exclude them is not only safer, but possibly more economical in the long run.

Now, if this 100,000 were distributed in the existing proportions of classes, the numbers would be divided as follows:—

Seaman class and boys	-	-	43,000	} Compare page 541
Engine-room complements	-	-	24,000	
Artisans and miscellaneous	-	-	12,000	
Royal Marines	-	-	21,000	

The proposed division is:—

Seaman Corps	-	-	-	35,000, or + 5,000
Marine Corps	-	-	-	35,000, or + 20,000
Engineer Corps	-	-	-	25,000, or + 8,000
Staff Corps	-	-	-	5,000, or — 3,500

In the Staff Corps would be included those miscellaneous ratings which could not be affiliated with one or other of the three arms, the Marine Corps, however, supplying as many of the trade ratings as possible.

This altered proportion, which is mainly an extra increase to the Marines, is advocated on the score of economy with equal efficiency. There can, of course, be little doubt that the whole of the combatant work of the Navy could be performed with the greatest efficiency entirely by our present class of seamen; but they are trained from boyhood at a cost of approximately £300 a head, whereas a Marine Artilleryman is made efficient in a much shorter period at a cost of only £100, while the infantryman is less costly still; yet rank for rank the marine is, if anything, better with the gun and rifle, owing to his stricter discipline at drill and practice; and that this discipline is more than ever necessary to-day has been conclusively shown by the Yalu River fight. In landing expeditions there can be little doubt of the superiority of the marine, on account of his tactical training, fire-discipline, and superior weight; and this work forms a great part of almost every British campaign, frequently, too, when it has not been found necessary to mobilise the fleet; and here comes in another point. In the ordinary number of ships in commission during peace, there would be no room for the 100,000 men, and the seaman would rapidly deteriorate if not kept at sea, while the marine in barracks is by no means losing efficiency, but rather increasing it. The extra numbers will allow of a Marine Torpedo School being formed,



while also a Marine Brigade will be available for War Office disposal in minor expeditions, to ease the strain on our overtaxed Army in small wars, where no necessity for mobilising the Navy, or calling out the Army Reserves, exists.

Thus in peace the complements of sea-going ships would contain nearly as many seamen as at present, the increase of marines merely allowing for their carrying out extra gunnery and torpedo duties and work now performed by daymen; thus the deck duties would be no heavier than at present, rather lighter, and the marines would also take a share of boatwork. It is only in war that the marines would be required in some ships to partly replace or supplement seamen. Of course the trained seaman is indispensable, but the duties which he alone can perform are daily becoming less, and the marine can equally well man the guns and torpedo-tubes, signal, do much of the deck work, and pull a boat, if he only receives a slight extra training; and the reduction to the Exchequer in the numbers and distribution here described, in lieu of an equal increase according to the present proportions, would be some £300,000 a-year. There never has been any lack of good recruits to the Marines, and with the higher class of work that would be allotted to them under this scheme, in all probability men could be obtained in sufficient numbers even for this great increase. A further economy is effected by replacing miscellaneous ratings by marines, as well as carrying out the principle that there should be no man carried untrained to fight.

It has lately been pointed out that the behaviour of the marines as regards the defaulters' book side of the question does not compare well with that of the seamen. This is in part due to their period of training in barracks before embarkation being much shortened of late years, owing to the increase of the fleet without increase to the corps. Moreover, the young marine early embarked finds the lack of exercise and physical restraints of ship life very hard at first, and when he gets ashore rather kicks against the pricks. Yet, on the whole, his discipline is far stricter than that of the bluejacket and stands better the actual trial of war. It must be remembered that, in men trained and paid to fight, a warlike spirit must be encouraged, and the *murderous* instinct of the young male animal must not be entirely lacking. It is not the man with the best defaulter's sheet who always makes the best soldier in the stress of war. On the other hand, a clear sheet with the added self-respect is likely to denote a reliable combatant, and thus the early training of the bluejacket is not wasted.

#### OFFICERS.

The question of distribution of officers as regards these two corps is an equally difficult one, for watch-keepers and navigators will always be required, and the present proportion could not be reduced; but it is certain that Marine officers could be readily educated to carry out the duties of gunnery and torpedo specialists, and even to keep watch under simple circumstances. It is therefore an extravagance to educate boys to be highly-skilled seamen and navigators, and then to take them

almost entirely from that class of duty to perform purely military work. However, in the peace routine the natural proportional increase of lieutenants would place a less strain on them than at present, and enable men to be spared for the promotion course; while future employment would be provided for some of the "non-promoted" on the (B) Staff. Also, in war, it must not be forgotten that the watch-keepers have an excellent reserve in the Warrant officers of the Seaman Corps, who would be promoted in large numbers to lieutenant's rank to relieve the strain. There would only be one class of Warrant officer in the Seaman Corps, an increased list of "Boatswains," who would be especially and highly trained for this eventuality of war; and the very best of them would receive a similar reward in peace. The "Gunner's" work would be performed in part by a young Marine officer, in part by a N.C.O. of the same corps.

As for the improved position of the officers of the Engineer Corps, it is nothing more than is demanded by the barest justice. At present they have the greatest responsibility, the hardest work, and the smallest reward. If the reward be not given to them as a matter of justice, something must be given them as a matter of necessity. More and better engineers we must have for the Navy of the future, and it is impossible to get them without paying highly in money or position, and the cheaper of these is position, and probably tends to bring the better class of men.

The engineer is here also made responsible to the captain for the mechanical efficiency of every portion of the ship and her equipment. It is said that he has already too many responsibilities; that is true in a sense—too many for the rewards and position, but not too many for his ability, if he has a sufficient staff to aid him. He is the one man in the ship who is likely to understand construction, from both its practical and scientific point of view, and the only change is, that the carpenter and construction branch look to him as their head.

With the senior engineer as an executive staff officer, the engine-room artificers will have a well-deserved chance of promotion to Warrant rank, and the stoker will be trained for the work required of him in war.

#### THE ORGANISATION AND DISTRIBUTION FOR MOBILISATION, ETC.

Each corps will have three (or more) main divisions or depôts corresponding to the dockyard ports, accommodated in barracks. The depôts would be subdivided into strong companies—seamen, about 200; marines, 250; and engineers 100 each. To each company a particular battle-ship or large cruiser would be allotted, and their fates would be strongly linked till the ship became obsolete. Allowing for a due amount of elasticity to prevent hardships to individuals, a Seaman company would provide one watch or division of the complement, the Marine company would provide the detachment, and so on. The crews of small ships would either be provided by the residues of companies told off to larger vessels, or by companies split up for the purpose. It is calculated, for example, that a company of Marines would

supply a peace detachment of 100 to a battle-ship, 20 to a small craft, and still have a nucleus of 130 for recruits, training, trades ashore, and barrack staff.

One advantage of this system is, that the skeleton crew of a ship in reserve could be supplied by its particular company, the crews being relieved in whole or part every few weeks; thus all would learn the guns, engines, and working of the ship, while the training of the company and the discipline of the men would not be neglected. On mobilisation, all would march on board, not only acquainted with their officers and one another, but also with the ship, which herself would have been kept in readiness for sea by their very hands. It would be an added source of comfort to all concerned to have a definite headquarters to which they would return, when at home, throughout their service. Each headquarters would naturally have a staff, with instructors and schools for training purposes, where the men would not only be first instructed, but would *revise* in each period of home service.

The special kinds of elasticity of regulation which would be necessary to make the system work smoothly would be as follows :—

1. Officers and men would be allowed to exchange freely from one company or division to another, where this could be effected without expense or detriment to the Service.

2. In the case of a large ship being re-commissioned abroad, it would change companies with a reserve ship of the same class if possible.

3. The strength of a Seaman company would vary slightly with the class of ship to which it was attached, and if the ship was in reserve and likely to remain so, it might be reduced considerably by drafts, etc.

4. As there would be some 120 companies of Marines, six divisions at least would be necessary, viz., Chatham, Deal, Eastney, Forton, Portland, and Plymouth; or two at Plymouth and one at Sheerness, instead of at Portland and Deal respectively. As this would still leave twenty companies at each division, the headquarters of companies would in most cases move to the station on which the ships were serving; thus a battalion would be kept at Malta, companies at Halifax, Bermuda, the Cape, Sydney, Hong-Kong, Esquimalt, etc. These, while aiding the War Office as peace garrisons, being ready for small wars, serving as bases for Imperial Federation, and giving instructors for colonial forces, would be at hand to replace sick and casualties in the fleet, and to man liners on the outbreak of war, or as occasion might require. To still further reduce the strength at headquarters there would be the torpedo and gunnery schools; and, for infantry training, battalion headquarters should be kept at Shorncliffe, Aldershot, and Okehampton, throughout the year, to which companies whose ships were in reserve would be attached for six weeks at a time for field training. The troops so trained in any one year would form the Marine brigade of a minor expedition, always supposing that they were not required in the fleet. By these means our Imperial preparations for every description of war would be materially increased.

5. As regards the officers of all corps, considerable latitude would be required, and Staff officers would be specially selected.

In the ordinary case of a ship commissioning, a draft suited to the complement would be sent from the company, while the remainder formed a cadre for training recruits, replacing casualties, etc. The draft once on board would form a fixed unit (a division, detachment, or engine-room complement according to the service), and would be paid, administered, and punished by its senior officer, who would have a writer, chief petty officer, sergeant-major, or Warrant officer to assist him. By "punished," reference is only meant to minor punishments, every grave offence being referred by the officer to the captain for settlement, as also in the case of the award of badges, appointments, promotions, etc. The Chief of Staff would also be informed and consulted, but himself would only inflict minor punishments on men attached to the Staff.

As regards the Discipline Act, it would be formed on the lines of the Army Act, and it would be necessary that officers of all arms should sit on courts-martial for trial of men of their own corps. Wherever practicable it should be immaterial whether officers or men were serving under Navy or Army Act, especially in the case of marines. Nothing, however, should interfere with the supreme authority of the Admiralty, or of a commanding admiral or captain in the limits of his command.

#### THE SEAMAN CORPS.—ENTRY AND TRAINING, ETC.

Bearing in mind that the duties of the rank and file of this corps would be very much the same under the new conditions as the old, and that the present system gives such an admirable article, there is no reason for change in the present system of entry and training. The extra duties on board given to the marines would not affect the early training of the seamen, although it would tend to reduce seamen complements by the transferred gunnery, torpedo, and signalling specialists; these changes being effected not because the present class of seamen do not perform the work well, but on the grounds of economy with equal efficiency.

All the seamen should be entered young, and should pass through a training-ship, as it is the early training alone which makes them into first-class seamen and marks their difference from the marines. The experiment of the "Northampton" does not appear to be an unqualified success, as the age of entry detracts from that perfect training we are accustomed to expect in the British seaman, and rumour says that the men have not turned out to be good characters generally. The training-ships require a slight increase in number or capacity to cope with all requirements, but there is no lack of recruits for them, so that to enter two classes of seamen seems an unnecessary complication.

The period of first engagement would also remain at twelve years from the age of eighteen, for no short-service system can be held applicable to our seamen. Although the method of Scharnhorst and his Prussian successors has been universally accepted as the best for obtaining large forces at a small cost, yet without compulsory service it is an impossible one for us to adopt, and an argument which applies to a

soldier who has only one art and one weapon to learn cannot be used of the seaman and the marine gunner, whose duties are so multifarious and require such careful study. It might possibly be applied to marine infantry, but seamen enlisted for five years in the active Navy and seven years in the Reserve would carry to the shore with them a large amount of *wasted national expenditure*. If, as has been suggested, the men found employment in the merchant service, they would rapidly deteriorate, and would frequently not be available when wanted. Besides the conditions of service, the amount of comfort, and the style of treatment the men are subject to in all but the best lines, would drive a great number of the most respectable men to seek employment ashore, which with their superior education they would probably readily obtain. In that case they would soon cease even to be seamen, and though this might have the advantage that they could be found when wanted, it seems highly probable that, being married, and with a comfortable billet ashore, they would return to the lower deck with considerable reluctance. Such a system, too, would admit of a very slight gunnery training, in which subject now the education of the seaman is inadequate. The latest modern experience of naval warfare shows that the discipline of the future must, if anything, be far stricter than that of the past; the horrible effect of the bursting of a single shell, the necessity to constantly leave the quarters to extinguish fires, the isolation of each casemate and barbette's crew, the difficulty of keeping up a rapid supply of ammunition, the dreadful effect of a successful ram or torpedo, are new trials (though many of them had their counterpart in the past), and require an iron discipline to counteract them. That discipline in its proper state of rigidity our present seamen class even rarely attain, and this will probably be very much the case always, for a careless, independent spirit seems inseparable from the bluejacket, and he might lose in dash and initiative if he were robbed of it—a reason for giving the most important gunnery work to the marines.

In the training-ship the same amount of attention as at present should be paid to sail-drill, for it is eminently calculated to improve the boy on account of the agility, coolness, and nerve thereby acquired. The seaman must be accustomed, even in the modern battle-ship, to work in the tops, and to place himself in positions which would affect the man not trained from boyhood with giddiness or loss of nerve.

On leaving the training-ship, the boy would be at once posted to his permanent company, where his training would be continued under his own officers. Most of the boys would go to companies of which the ships were in commission, for reasons already given; and the boys would be drafted as soon as fit. Those who went to other companies would be able to more thoroughly complete their preliminary education as skeleton crews, and in the evolutions carried out in *port training-ships* for young officers and for the officers of the promotion course.

#### GUNNERY TRAINING.

It has already been hinted that, in the author's opinion, the gunnery training of the Navy is not all that it might be, and, therefore, before

going further, the question of gunnery training and gunnery schools will be discussed.

Good gunnery is still, so far as the limited experience of the naval combat vouchsafed to us can show, the determining factor in the battle. Coolness and rapidity of work, a trained eye and steady nerve, mechanical skill and physical force intelligently applied, are necessary in the gunner, and can only be acquired or cultivated by much painstaking work. The modern weapon repays in its effects the most assiduous application, and is only at its best in the hands of a master; but in order to become a master the average man has to make gunnery the profession of his life, and it will not permit of a divided service. These facts are recognised, yet the results of our practices and prize-firings are not good, and gunnery appears to be too frequently pushed aside for other work. The courses are being continually cut down, instead of being lengthened, and the average of gunnery knowledge among officers and men of the fleet is so low that specialists are required not only for the higher work, but also for most elementary training. No one class is to blame for this; it is simply due to the lack of officers and men to man the fleet, to the constantly increasing variety of guns, and to the multitude of other subjects which have to be studied by the Seaman class. The Marine Artillery alone are able to devote most of their time to the work, and that devotion is repaid by most excellent results in peace and war; but is rewarded by only giving to the corps the secondary armament of the ship, and by placing their officers, when embarked, in exactly the same position as those naval lieutenants who have given little or no attention to the subject. Meanwhile, an officer is taken from those watch-keeping and seaman duties for which he has been trained at great expense to carry on the gunnery work of the ship. This specialist is frequently placed, therefore, in a position to control the gunnery duties of a Marine officer many years older than himself, and of far greater experience. Thus, not only is one officer taken for a long period of his service from his proper work, but the other, the life-devoted gunner, is given no real share in the gunnery control of the ship, and has to spend many hours of each day in forced inaction. Hence it is not extraordinary that the Naval officer *appears* to be able to teach the Marine, for the one has every inducement to keep his knowledge fresh and on the surface, while the other has no prize, no encouragement for any zeal he may display. In the new Navy this state of things could have no existence. The corps would work amicably side by side as at present, but the Marine, in return for the service he renders in deck duties, would be treated as a specialist in gunnery work, *and it was for this very purpose that the Marine Artillery was originally established.*

The Naval definition of "gunnery," from the Army point of view, is extraordinarily comprehensive, and includes what a marine gunner, or a soldier, would call infantry drill, minor tactics, musketry, field battery, and heavy, light, and machine-gun drills; that is, combines the duties of an artillery and an infantry soldier, and in these different subjects the

Marine officer receives a far more thorough training than the gunnery lieutenant, and probably possesses a deeper knowledge.

Yet, while the marine should do the specialist gunnery work on board, there would be no vexatious interference with the internal discipline of corps, and marine instructors would only train seamen at the request of an officer of the Seaman Corps, or by order of the Chief of the Staff when no seaman was available or capable of the work—an eventuality which would rarely arise. The Marine officer would merely be the Gunnery Staff officer, make the returns, and have charge of stores. He would require a slightly different training from his present one for the boat work and torpedo duties; but a very few weeks' work would make the average officer capable of commanding a gun-boat or torpedo-boat for practice purposes. The torpedo schools would do the rest. (Seamen, as heretofore, would command gun-boats or torpedo-boats for manœuvres or when regularly commissioned.)

No specialists of the Seaman Corps would be trained in either gunnery or torpedo, but an officer taking a first class in either or both of these subjects in his promotion course should be fully qualified to act as instructor to the Seaman Corps, and when so employed on shore would count time as in a ship-of-war at sea, and receive extra pay. These officers might also be appointed as Staff officers for gunnery in addition to other duties, where no Marine officer was carried, but it is intended that the gunnery training of the *whole* of the Seaman officers should be so raised above the present standard by the promotion course that it will be no longer necessary to carry a lieutenant as *instructor* of gunnery or torpedo.

With regard to the men, the permanent company system would enable them to become most fully acquainted with the guns of their particular ship, and, as a rule, these are so varied in their nature, that an adequate training in these would be sufficient finish, if they had received a careful grounding in the depôt school, where many weeks of careful instruction should be devoted to aiming and practice, and also to field exercise, which work could be done more systematically at the school than elsewhere. It would be a distinct gain if in the field exercises the Army systems and books were adopted, in the Navy, so that at any rate the two corps should be worked by the same words of command. Even in heavy gun drill the Royal Artillery arrangement of having a *gun captain* in addition to the *gun layer* has points in its favour for naval use, especially at Q.F. guns, where the layer has to keep his attention concentrated on the object, and so cannot superintend the working of the gun. The isolated casemate positions of guns makes this more necessary. As regards infantry and musketry work, the Army books have had such especial care expended on them that they are most valuable, and there is little in either book which could not be adapted to the Naval Service. The advantage in combined work is obvious.

#### SCHOOLS.

There would, therefore, be a depôt school of gunnery at each



depôt, where all seamen would be trained, and the older men undergo "revision"; and torpedo schools would be formed on the same lines for a few selected men.

Finally, there would be a central gunnery and torpedo school for training cadets, Seaman officers in the promotion course, and Marine officers for their special work. The staff would consist of a due proportion of officers of both corps, with an engineer or two, as might be required; the command of the school to be given alternately to a seaman or marine. In this central school, drill books, manuals, etc., would be compiled, and from it the systems would emanate on which the gunnery (and torpedo) training would be based. Here, too, experiments and trials of guns and mountings could be carried out.

The seamen would be more particularly trained in those guns which are mounted in the tops, in boats, guns, and also in the torpedo work of the torpedo-boat; in fact, in that description of work for which their seamanship training most fits them, while the marines could work more particularly the larger guns and torpedo-tubes in the battle-ship and larger class of vessel, where their physique and discipline will most tell. To-day it is argued that the main armament shall not be given to the marines, because they are probably the first men who would be despatched in a landing expedition, so that these guns would, in a time of emergency, be left without crews. But this argument has little foundation in practice, for marines are rarely landed unless accompanied by bluejackets, and instead of the field guns being given to marines, they are always manned by seamen; and in the evolution "Man and Arm Boats," the marines never go away. Also, if this chance is thought to be a serious source of danger, it applies equally to every class of armament, for it is the smaller guns which will be of the greatest value in a resisted landing. In fact, the argument is unsubstantial, for landing expeditions will only be undertaken when the fleet is free from danger, and the seaman will be equally required away from the ship on these occasions for boat-work; and it is entirely immaterial which men work particular guns so long as all are used to the fullest extent to which they are trained. A solution which has been suggested is to have mixed gun's crews of the two classes, but the system does not work in practice on account of its interfering with the unity of command. With the fixed unit system there is time for all the complement to be frequently drilled in all the different quarters to provide for this emergency.

#### ENTRY AND TRAINING OF OFFICERS—SEAMAN CLASS.

The officers for the Seaman Corps would be entered by *open* competition between the ages of fifteen-and-a-half and seventeen. (The reasons for adopting this later entry are fully given in Part II.) There is small objection to a system resembling that in force in the United States, by which the officers of all three corps would be entered by the same examination, and at the same age, if this arrangement should appear more convenient and more economical; but there are a few points in favour of having separate examinations, the subjects being slightly varied



to better meet the requirements of the different services. The Marines, for instance, would be a year or so older than the others; nevertheless, it would be arranged that all received their commissions at practically the same age, and the promotions in the different corps should also be so controlled that each step could be gained by average men in about the same time. Also, our numbers are somewhat too large for the American system, for it loses its greatest recommendation when separate colleges are required for the after-training.

A few cadet-ships would be given by the Admiralty to sons of officers with exceptional services, and all sons of officers would be admitted to the different colleges on payment of smaller fees than those paid by civilians at a scale varying with the rank of the parent. These conditions would be the same at all the educational establishments.

The after-training of our Seaman officers would resemble the French system in many ways, for the Seaman cadet would spend from two to three years at the Naval College—probably near Portsmouth would be the best place for this. A considerable portion of the summer months would be spent in learning practical seamanship on board brigs, torpedo-boats, and the specially-commissioned training battle-ships, with at least one short cruise in every summer; but the cadet would never be appointed to a regular commissioned ship.

There would be little difference in the subjects taught at the college from those now required in the examination for a lieutenant's commission, but the very high standard of mathematical training attained by the successful candidates at the entrance examination (if the competition was anything like that at present for entrance to Woolwich or the Marines) would lessen the need for instruction in these subjects at the college, and the extra time could be devoted to a more elaborate and practical course of technical work.

After the sub-lieutenant's commission had been obtained, and the young officer appointed to his definite unit at the dépôt, he would go through a further practical course in which he would be required to impart instruction to his own men, on the principle that in almost every lesson given by a young instructor he learns more than the instructed, and the information thus gained will not be easily lost. This would complete his third year of instruction.

Finally, the sub-lieutenant, at about twenty years of age, will be appointed as a ward-room officer to his first ship, and here for at least a year of his first commission he will be receiving instruction under the personal supervision of the Chief of Staff, after which time he should be equal to any duties he could be called on to perform.

His future career would then be somewhat as follows:—He would be required to pass a practical examination in duties afloat before a board of officers to qualify him for the rank of lieutenant, which step he would receive in due course with approximately the same amount of seniority as officers of the corresponding rank in the other corps. After qualifying for lieutenant he will be employed in the full duties of a watch-keeper and division officer, or take up navigation as a speciality. If his con-

fidential reports were satisfactory he could, as further training, pass for promotion on the system already described. If he has no such ambition he will serve on as watch-keeper or navigator, and take his chance of promotion to commander and captain by distinguished service, or as a qualified navigator, or volunteer for the B line of Staff duties. A navigator, promoted to captain, could obtain command of depôts, yachts, or be employed on the Staff as master of the fleet; but it would very rarely happen that an officer who had not qualified for promotion would be given the command of a sea-going man-of-war, unless for distinguished service.

There would be one more cabin vacant in the large ships, for no Naval instructors would be borne, all the civilian education having been completed at the colleges, and even there civilian professors would only be employed for subjects that could not be equally well taught by officers. It should not be forgotten that where officers have the knowledge and ability to teach any subject whatever, even including foreign languages, they are the cheapest and best instructors, and to employ them is both giving encouragement to study and increasing our war reserves. Chaplains would be borne on the Staff where necessary. The gun-room would disappear, but the officers of the Staff would mess with the captain. The numbers of the officers of the Seaman Corps would be calculated to give more watch-keepers than at present, so that the lieutenants of divisions would have time to look after their additional interior economy duties, and also to permit of the careful education in practical work of the sub-lieutenants, and for gunnery and other drills. This increase would not be difficult to accommodate, as all the subordinate officers and lieutenants (G) and (T) would have disappeared; and there would also be room for the extra Marine and Engineer officers.

#### WARRANT OFFICERS.

There would be about 1,000 boatswains in the Seaman Corps, trained especially to supplement the lieutenants' list in war, and selected from the most promising boys in the training-ship, "the advanced class," who, instead of being drafted with the remainder, would be permitted to continue their education for a year or so longer to advance their studies thoroughly in navigation and pilotage; then, after satisfactory service afloat as petty officers, they would be allowed to pass for the warrant as early as possible. These again would be permitted to pass for a lieutenant's commission about the age of thirty, but only a very limited number of promotions would be given in peace; in war the commission would come as a matter of certainty. These men would, in fact, form an active reserve of officers, hence gunnery and torpedo should form an important part of their examination. Older men might gain lieutenants' rank for service in charge of stores and duty at the dockyards and depôts, or to serve on the (B) Staff. A similar method would be adopted for the encouragement and reward of a most deserving class, the chief petty officers, instructors of gunnery, torpedo, and seamanship, etc., who might be selected for Warrant rank without examination. Being much older

than the preceding class of boatswains, they would have no hope of a commission, the numbers thus promoted would be few, and they would mainly be employed in charge of instructions at the schools and depôts.

#### THE MARINE CORPS.

The foregoing has shown a great deal of the work required to be done by the Royal Marines, and the position they will fill in this novel method of manning the Navy ; but a good deal yet remains to be cleared up. To the history of the past it would be useless to appeal in a novel scheme which is only designed to man a Navy of the future ; but there is this in the past history of the present Corps of Marines : that when any peculiar trial or difficult work has fallen to its lot, it has never failed to give more than ordinary satisfaction, and this in spite of peace treatment which can only be described as contemptuous.

The new Marine Corps would consist of men enlisted as a rule between the ages of seventeen and twenty-three, on very much the present lines, and with very much the present exceptions as to age conditions. There would be only one branch of the corps which would be dressed in blue, and which would rank as part of the Navy, after the Seaman Corps, but before the Engineers, and taking precedence ashore as part of the Navy, therefore, before all regiments of the land forces. As regards uniform and equipment, it only remains to add that it would not copy any particular branch of the land forces, but be designed on quite independent lines to suit the requirements of a sea-soldier. Thus the valise equipment, with its tedious marching-order parades and consequent waste of time, would disappear. The men on joining would first be instructed in infantry drill and musketry on a system which should be identical for all three corps—the Army system for choice, only modified where absolutely necessary. As soon as the recruits have been thus trained as infantry, they should commence a preliminary or trial course of naval gunnery, to last them six weeks ; at the termination of this an examination should place the men in three categories. The worst class, if of good character, might be retained as privates, but if their character was not perfectly satisfactory, or if their intelligence was exceptionally below the standard, they should be at once discharged, for, judging by the present supply of recruits, there would never be any necessity to retain men who would do the Service no credit. The men in the second category should be put through a short further course of gunnery to make them efficient for the less important numbers at any nature of gun, and be dismissed as privates (T.M.), while the remainder would be put through a long course and rated according to their qualifications as first or second-class gunners, and paid accordingly. After the gunnery course would commence the company training, in which both privates and gunners would be taught certain elementary matters of seamanship, such as knotting and splicing, swimming, boat-sailing, rowing, etc., by their own officers ; the gunners would also undergo a practical course of either torpedo or coast-defence artillery, with the mounting and dismounting of ordnance ; the choice of these alternate lines being left to themselves. Others, either gunners or

privates, should be permitted to volunteer as signallers, and for training for the different trades and special avocations which marines can follow on board ship, and which may require special instruction. These shore instructions would be continued by the company officers in a systematic manner after embarkation.

After one commission a certain small proportion of the privates might be relegated to the Reserve, but not the gunners. This is the whole education of the rank and file, but present results show what excellent men such a system is likely to turn out, and at a very small cost as compared with the seamen. Non-commissioned officers would be selected as at present, after passing a qualifying examination, and as gunnery would be one of the most important subjects, the larger proportion of the successful men would naturally be gunners. However, signallers, tradesmen, etc., would be promoted for skill in their own lines. Privates, or gunners second class, would be able to rise to gunners, etc., if qualified in a revising course.

#### OFFICERS.

Officers would be entered by open competition between the ages of sixteen and eighteen on a similar system to the Seaman officers. A college would be set apart for the training of these cadets at a dockyard port, where their education would be carried out on very much the same lines as for the R.M.A. at present, only more attention would be paid at the college to theoretical gunnery, practical physics, and elementary navigation, the necessary time being gained by a reduction in the hours devoted to mathematics, proficiency in which should be the greatest essential of the entrance examination. On leaving the college the young lieutenant would be posted direct to his division, where he would go through a long course of recruits' training with the men, including both torpedo and coast-defence work. When trained he would be drafted to a company, whose ship was in commission, to learn his duties afloat. On board it would by no means be considered that his education had been completed, but he would have to learn the practical work now carried out by the gunner, thus qualifying to assist the officer commanding the marines not only in detachment duties, but also with gunnery staff work. As soon as he was proficient in his work afloat, he would pass a practical examination before a board of officers for the rank of captain, to which rank he would be promoted at about the same age as sub-lieutenants to lieutenant in the Seaman Corps. Next, at any time after having completed two years' service in a ship-of-war at sea, he would be allowed to pass through a course to qualify for the rank of major. This promotion course would correspond to that undergone by Seaman officers, but gunnery, torpedo (theoretical and practical), military history and tactics, topography, fortification, administration, and law, would be the main subjects. The examination would not be at all on the present Army lines, but the subjects would be entirely adapted to the Naval Service and coast defence. Thus "law" would be naval as well as military, "tactics" treat as much of the naval gun as of cavalry, and so on. The course would last for about a year, combining practice

and theory where possible. After examination, first or second-class certificates would be granted to the successful candidates, and they would be considered qualified not only as "company commanders," but also for Staff officers (gunnery and torpedo)—that is, "detachment commanders." Of course, the men who obtain first-class certificates in gunnery or torpedo will be the ones employed in the principal Staff appointments for these duties. This long promotion course and examination replaces the two examinations now required for captain and major, and as it would be undergone when the brain is at its most fruitful period, twenty-five to thirty, it should turn out most highly qualified officers in their particular work. Officers who fail, or who never attempt to pass for major, would not be employed on the gunnery or torpedo staff; therefore, would only be embarked for detachment duties, and would, probably, try for appointments with Militia or Volunteers, but they might volunteer for the (B) Staff to avoid retirement as captain. As embarkation would carry with it the extra Staff pay and position, officers would be rather eager to get ships than to avoid them, and two years' sea or colonial service in each rank would be absolutely necessary for promotion to major or lieutenant-colonel. Thus no roster would be kept, officers going with their companies, but exchanges and temporary transfers would be freely permitted to allow officers to complete their necessary foreign service. Finally, majors might pass the present Army examination for lieutenant-colonel, and be promoted to that rank by selection.

#### THE ROYAL MARINES—PAY, DISTRIBUTION, ETC.

It is probable that the extra number of recruits required in the new corps could be easily obtained and of sufficient quality, though, possibly, with a lower standard of height. The Royal Marines have always been popular, and it is probable that the pay might remain very much as at present, viz., 1s. 2d., 1s. 3d., 1s. 4d., and 1s. 6d. per diem, for the four different classes of rank and file respectively, while the N.C.O.'s would receive infantry pay, but with additions for gunnery and torpedo qualifications, and if passed as instructors, which would raise the pay of such men to about the artillery rate. There is one considerable addition that might be required to the emoluments ashore to bring in the extra men, and that is a free ration of bread and meat; this is given in both Army and Navy, but is denied to the Marine ashore, while he gets it afloat.

The strength of a company would be 1 major, 3 captains, 4 lieutenants, 1 warrant officer, 4 staff sergeants, 3 colour-sergeants, 12 sergeants, 20 corporals, 220 gunners, buglers, and privates; and from this a detachment would be formed somewhat as follows:—

#### *Detachment to Flag-ship.*

- 1 major (on admiral's staff, and to command fleet, battalion, and detachment).
- 2 captains (G) or (T) duties.
- 2 lieutenants (for gunnery, torpedo, detachment, or guard duties).
- 1 sergeant-major (for gunner's duties).

- 1 colour-sergeant (for pay and detachment duties).
- 6 sergeants (deck and gunnery duties).
- 140 rank and file, and buglers as required.

*For Battle-ship or Cruiser (not Flag-ship).*

- 1 captain or major (for gunnery and torpedo staff, and command detachment).
- 2 subalterns (for (G), (T), guard, and detachment duties).
- 1 staff sergeant for gunnery duties, and the rest as above. Smaller ships in proportion.

The remainder of a company would be for duties ashore, but some officers and N.C.O's would be going through courses or employed at schools; and there would always be a proportion of recruits.

In all ranks it would happen, therefore, that the pay was slightly lower than the seaman class, but the gunnery and other working pay would put the best marines on an equality. It is, however, in education that the relative cheapness of the marine is most evident. The single extravagance of the scheme is in the detached battalions and the companies in the Colonies, but they are designed to obtain greatly increased national efficiency and preparedness for minor wars, to relieve a strain which the War Office always feels very heavily, and, secondly, to help on the cause of Imperial federation. The Colonial companies would provide instructors to Colonial troops in coast defence and submarine mining if required, as well as forming garrisons in case of a sudden outbreak of war; thus the Colonies might be induced to contribute to their support. Probably many recruits would join abroad. As regards the manning of the fleet on the station, it would be invaluable to have men at hand to replace casualties in either peace or war.

#### OFFICERS' PAY AND STAFF APPOINTMENTS.

The pay would be regulated at the same rates as the Seaman class; company and detachment commanders would receive command money or Staff pay in addition at about the same rate as lieutenants (G) and (T) do now, or as garrison artillery officers. The detached battalions would find extra employment for lieutenant-colonels, who would receive command pay, as do now the lieutenant-colonels in every service but the Marines. Adjutants and instructors at the divisions and schools for training officers and recruits would be paid as at present. There would be a general officer on the Board of Admiralty, and one (a major-general) on the Staff at each dock-yard port to command two divisions. These appointments would find adequate employment for the augmented list of senior officers, as they would be additional to the present Marine Office and Divisional Staff. This is the mere outline of a scheme which has been fully worked out, and would give excellent results at an economical rate.

#### THE ENGINEER CORPS.

In every possible respect this corps would be on the same footing as the others, thus only details require explanation.

The 25,000 men of the corps would be composed of three classes,

artificers, mechanics, and stokers, incorporated in companies amalgamated to form the Engineer complement of a ship. The total is a clear increase of 5,000 men; in reality more, for many men would be employed under the Engineer officers for work, who would remain marines for administrative purposes. Thus, all mechanics for whatever purposes borne, *i.e.*, carpenters, plumbers, armourers, blacksmiths, divers, tinsmiths, painters, &c., would belong to the Engineer companies, and be entered and trained on very much the present system, except where they were marines (and as many of them as possible should be taken from the marines).

However, a further increase would have been advocated, as engine-room complements are undoubtedly very small, but for the difficulty in obtaining good stoker recruits; moreover, the firemen of R.N.R. seem to promise a good reserve; 25,000 are ample for a peace footing, and in war marines would have to assist. This arrangement is not very satisfactory, but it is better than having recourse to inferior recruits in peace.

Stokers would be entered as at present at the various recruiting stations, and also with the existing age limits, which seem to be the most suitable; and on entry would be sent to one of the three depôts of the corps at the dockyards, would be given a definite place in a company, and then trained by their own officers in those subjects which, in the opinion of the heads of the corps, would best fit them to take their place as stokers in the fighting unit, *i.e.* the ship.<sup>1</sup> In their training, gunnery and musketry would not necessarily be neglected; but even in case of its adoption, it would be carried out under the Engineer staff, though Marine instructors might be lent to assist. "Shovel drill" and Engineer lectures would, however, be of the first importance.

Greater encouragement should be given to induce this class to re-engage, by additional petty officer ratings, by the chance of attaining warrant rank in a few cases, and by giving the extra 2d. a day to re-engaged men.

Similarly, engine-room artificers, recruited from private trade or workshops of the country (engine-fitters, boiler-makers, moulders, blacksmiths, or coppersmiths, the number of each trade regulated by the requirements of the service), would be posted at once to the company to be trained by their own officers. This very deserving class of petty officers would, as well as stokers, be given a chance of rising to warrant rank; and there would also be a few commissions placed within their reach, and in these rewards for long, meritorious, or distinguished service, carpenters would share, but necessarily only for charge of stores, etc.

As to discipline, it has already been explained that the senior Engineer officer would be in the same position on the Staff as the senior Marine, and similarly would pay, promote, and punish his men, and from the ranks of the Engineers themselves would be found writers, stewards, and police, to carry out administration and discipline, or these might, if necessary, be supplied to the corps by volunteers from the marines. It does not seem

<sup>1</sup> For suggestions as to these subjects see JOURNAL R.U.S.I., Vol. XXXV., No. 156.



probable that this "give-and-take" system, by which marines work under the Engineer officers and stokers are drilled by marines, would lead to any friction. It is merely the same "give and take" as that by which deck duties are carried on at present. The dividing line between responsibility for gunnery mountings and torpedo stores and fittings is always difficult to draw; much of this work would belong to the Engineers' province, and whilst a ship is in reserve it might be the duty of the Staff officers of these two corps to limit their respective spheres of responsibility. Between sensible men these matters are not difficult, but in controversial cases the Chief of Staff would decide, and cause affairs to run sufficiently smooth.

#### ENTRY AND TRAINING OF THE ENGINEER OFFICER.

The officers for this corps would be raised and trained on a system very much resembling the present one, *i.e.*, by an open competitive examination for boys from fourteen to sixteen years of age; and then further educated at an Engineering College. No direct commissions to be given, or temporary service Engineers to be allowed on the active lists, and no cadets to be passed out of the college with less than five years' training. Probably the improved position and the increased chance of rising to the highest ranks would attract sufficient candidates of a superior stamp without any great increase of pay in the lower ranks; but if not, the pay should be increased until the desired class of candidates is obtained.

Some improvement might be made in the subjects taught at the college, but this is discussed in Part II. From the college naval architects would be selected and then put through any after-course which might be considered desirable, but the remainder of the students would be given commissions as

#### SUB-LIEUTENANTS (E)

without any further course, and drafted to the headquarters of the Engineer divisions direct. Any further theoretical training which it might be considered desirable to give to the best officers should be deferred until after two years' service in a sea-going ship, when it would take the form of a promotion course for commander (E), as in the other corps.

On joining the depôts, the sub-lieutenants would go through the recruit-stoker's course, learning to impart instruction; and in this work the battle-ships, etc. (mentioned before as being commissioned for training purposes), would be utilised. If time for training in elementary seamanship and repository work could be found it would be highly useful for lifting heavy weights in cramped spaces, and other work which may fall to their lot. As in other corps, they would shortly be posted to a company for sea service, and would have to pass for lieutenant (E) before a Board in practical work afloat. As explained elsewhere, officers would be embarked with their companies, but much elasticity would be required for all to obtain the necessary sea time. In fact, as a rule, the companies belonging to ships in reserve would only have



one officer doing duty, as the others would be going through courses, or in charge of the engines of small craft employed at the port, and, in fact, reserve companies would be much split up for these duties. But the companies of new ships in reserve would be profitably employed in learning to work many new engines and new fittings with which they could have no previous acquaintance.

If qualified in the promotion course, lieutenants (E) would rise by the ranks of commander (E), etc., to admiral (E); those who do not qualify being retired as lieutenant (E), but having the (B) Staff as alternative. Higher officers of the corps would be employed as follows:—There would be captains or commanders (E) upon the Staff of Commanders-in-Chief of all squadrons or dockyard ports, for administrative Engineer duties at the depôts, in the dockyards for the Engineer work of the yards, at the Admiralty and on the N.I.D., and in superintending the construction and manufacture of naval machinery at contractors' works. Similarly, there would be an admiral (E) on the Board of Admiralty, and, possibly, for engineering or administrative duties elsewhere, thus making it possible for Engineers to rise to the very highest rank, a privilege fully earned by the vast importance of their work.

This ends the description of the active list. Much has necessarily been left out, but in such cases it is hoped that it will be understood either that things would remain as in our Navy of to-day, or, where this is impossible, would be arranged to meet the general plan; and this remark applies throughout the Essay.

More details concerning the Board of Admiralty than have been already indicated are rather beyond the subject, except in one particular, which is connected with strategical training. It is that the responsible Minister at the head of the Board would have as his principal adviser an officer of the Seaman Corps, known either as First Sea Lord or Chief of the Staff—the title is of little importance.

This officer would be our greatest strategist (the naval Moltke), who, working with the N.I.D., would see, as his especial duty, that plans of campaign were drawn up to meet various contingencies, and that the Navy was fully prepared to carry them out; and it is under him that the young Seaman-commanders would receive their higher strategical training.

The remainder of the Board would form a consultative body composed of some of the heads of the great departments.

#### RESERVES.

It was stated in the introduction that modern changes will probably so shorten future campaigns that no Reserves unavailable immediately on the outbreak of war should be counted in placing the fleet on a war footing; and therefore the necessary men for this purpose are, in the scheme, placed on the active list. But, although this is true, there is nothing either in history or in scientific development which indicates that a European war *will* certainly draw to a rapid conclusion. Campaigns

will be short, true, but before the whole strength of a nation can be crushed, and a peace forced on it against its will, a considerable time will generally elapse. The French Army surrendered at Sedan in six weeks from the outbreak of war, but it was many months before a peace could be effected which would at the same time satisfy a Republican France and a United Germany. This state of things is as probable in the future, and particularly when we think of ourselves as one of the belligerents. It is our aim that our rapidly mobilised fleet shall command the seas, and this command might be gained in two or three successful battles in the first month of war (but at an enormous cost of life and material). Yet, however complete this "Command of the Seas," it is somewhat doubtful if we have, unaided, the power to rapidly force a European opponent to terms. Our main chance lies in a complete blockade, while we crushed the enemy's commerce and robbed her of her Colonies. Such a struggle might well extend over a period of months or years, during every one of which we have more to lose than the enemy has to gain. For such a probable contingency we must be in some sort prepared. The blockade alone, judging from the history of naval war and the development of sea power to the present time, will require a fleet as large, if not larger, than the one required to first assert the supremacy; and each expedition will require a covering fleet; our commerce must be guarded from escaped cruisers, and our Colonies will need some protection. It is for these purposes that we require Reserves, namely, to replace casualties and keep the fleet at its fighting strength during this trying period; and to do this during a year of war 100,000 extra men may well be required. How shall these Reserves be obtained? Equally with the active list they must contain the three arms, and in very much the same proportions. It will, therefore, be most convenient to discuss them under the same heads as before.

It must not, however, be forgotten that in the 100,000 of the active list the Coastguard have not been included, yet it is intended that they shall be utilised to the fullest extent from the first moment of mobilisation. They would have a definite place in the Seaman and Engineer companies manning the ships of the First Reserve, and the half of them for service would "join on the telegram." They are too valuable material not to be utilised in the first brush, but they only number about 2,000 according to present arrangements, and even in the increased establishment would not be likely to amount to more than 3,000, and so could merely be considered as replacing an equal number of instructors and staff required for taking in hand the influx of men to the dépôts.

A similar small Reserve might be formed of men who would not re-engage for pension, but who were willing, for a small retaining fee, to serve in case of war breaking out during the six years next after their leaving the active list. These also should retain places in companies of ships in reserve, and should be called up to the dépôts for training for a fortnight in alternate years during the annual mobilisation. They would thus remain almost as efficient as the Coastguard; would at any rate be better than the average man of the R.N.R. Men discharged by purchase

might also join this class; but even then, with this addition, it is not likely to number more than a thousand men. So far, then, nothing is provided which can materially affect the situation.

Something may be left to the voluntary engagement of recruits during the war, for the history of the past has shown that a true military ardour is by no means lacking in our youth, and that probably in war-time recruiting would be remarkably brisk. It might, perhaps, be reckoned that 25,000 of the 100,000 could be raised in this way, and at least two of the corps—the Marines and the Engineers—could be adequately reinforced by men who had only received a very short training at war pressure. These men, however, could scarcely be counted on in the first batch required in the fleet to fill up the gaps left by the first month or so of war. For this purpose some 25,000 men, partially trained in peace, might be required; how are they to be obtained?

In order to meet these contingencies, each corps should have Reserve companies, having a number corresponding to a company on the active list. In peace they would have little more than a paper existence, that is, they would be merely cadres to be filled up on mobilisation to take the place of the active-list company which would have been drafted to the fleet. Then, if the ranks of the Reserve companies could only be kept fairly full during war, a sufficient number of officers and men could be drafted at any time to the corresponding service companies to maintain the fleet at full strength. As a ship was destroyed or lost, the Reserve company which was destined to keep her at war strength would have to find crews for a ship being completed.

The ranks of these companies would be filled in four ways:—

1. The men from the active list who have been left at the dépôts, such as instructors or men temporarily unfit for active service, owing to lack of training, ill-health, etc., and any C.G. or Reservist of the class just described not sent to the fleet.
2. Pensioners up to fifty years of age. This class would be told off to their company on leaving the Service, would form its greatest paper strength, and might, if necessary, be called up to drill with it during the summer manœuvres, when the dépôts would be empty. These men would come into the dépôts immediately on mobilisation, and would at once fall into their places, having their greatest value in imparting instruction to the other classes by their disciplined example.
3. R.N.R. men not required for subsidised cruisers, etc. These men, if trained on the present lines, should be ready for drafting soon after they come in, but many men of this class would probably only join the dépôt after many months of war.
4. Recruits who join after the commencement of the war and have yet to be trained.

What number would these classes supply?

In the Seaman Corps there might be the following :—

	Pensioners	-	-	-	-	10,000
R.N.R.	{ Able Seamen	-	-	-	-	10,800
	{ Ordinary Seamen	-	-	-	-	10,600
	{ Boys	-	-	-	-	300
	Staff, etc., from Service Company					1,000
						<hr/> 32,700

To imagine that these numbers would all be available is to take a too hopeful estimate, but it is possible that during the year recruits would come in to make up the required 35,000. For officers to these companies there might be found 200 retired lieutenants and commanders, and perhaps 400 R.N.R. officers, who would also have been posted to their companies during peace. This supply is hardly adequate, but many Warrant officers in the fleet would be promoted to fill death vacancies, and so a sufficient supply of watch-keepers obtained; besides, the later age of entry would permit of cadets being drafted early to the fleet as sub-lieutenants with shortened training.

For the Marine Corps, with only its existing reserves, to find 35,000 would not be easy, but a fair Marine Infantryman might be created at high-pressure training in three months, if intended to fight by the side of experienced men. Also a first-class Reserve might be formed in the Marines by the discharge of some of the privates at the end of their first tour of sea-service, to complete, in the Reserve, their first term of limited engagement, on the same terms as our soldiers do now. The number so discharged should be very small—in no case to exceed 2,000 all told. They would suffice to form the cadres, but a Militia plan, though more costly, would provide a surer extra supply of men; but this, also, has the objection that it would come in competition with the Army Militia, and so might not find favour with the War Office. This might be avoided if the recruits for the Marine Militia were, if possible, obtained from a seafaring class—fishermen, long-shore men, etc., but only from such men as could be obtained on mobilisation, and who would come out for compulsory training once in every year; thus no sailors would be eligible belonging to ships making distant voyages. It is, in fact, principally the fisherman class who would be appealed to, the real value of acquaintance with the sea being the non-liability to sea-sickness, being able to pull an oar, and able to swim. Any man, therefore, who could satisfy the accepting officer of these qualifications would be a desirable recruit.

The term of enlistment would be for six years, with the option of re-engagement for another six later on. Their engagement would differ from that of the present Militia in that they would engage to serve in the fleet during war, or whenever their services might be required, if the situation was such that the Regular Militia could be embodied, and at any time when called up for annual training; in fact, the men would be on the same footing as the Militia Reserve.

The annual training would be for six weeks in every year, at a period suited so as not to clash with the fishing season, for gun drill in closed

batteries can be carried on equally well at any season. The recruit would have to undergo four months' preliminary training—two months in infantry and musketry, and two months in gunnery at a Marine Division. This would be commenced immediately after enlistment at any time of the year. Once in each period of six years the man should be embarked for a period of fleet manœuvres to accustom him to the routine of a man-of-war.

It has recently been advocated that the fisher class should be induced to swell the ranks of the Naval Reserve (R.N.R.). It is certain that they should be obtained for naval war service in some corps or other, if it is possible to attract them; and it is claimed that a Militia system, if they would enlist (and that is the crucial point), is most likely to properly discipline them. The inculcation of habits of obedience is the greatest essential of their training, and the Militia discipline should be as strict as military law could make it, so that these men could be marched on board any ship at any time, and trusted to do their duty after the fashion of the hastily-trained marines of old, but with the knowledge of gunnery added. It must be remembered, however, that the first war duty of this Militia is only to fill the barracks at the Marine Divisions, to replace all the marines drafted to the Fleet; that it is only after, at least, a few weeks—after, at least, the first big battle—that any of them will be required on board, and this will give them some time to shake down.

The number of companies would equal the number of service companies on the principle explained, and these would be formed at our seaport towns round the coast (and also, possibly, in the Colonies). Four to eight companies would be incorporated in a battalion, and the different battalions will have headquarters at a convenient centre, with naval gun batteries for the annual trainings. The peace battalion organisation would resemble other Militia; it is possible, however, that the company would in many places be the highest independent unit.

#### OFFICERS.

It should not be difficult to obtain a company commander in each seaport centre, either a retired officer or a volunteer from civil life; and subalterns should also be obtainable, though not an absolutely necessary accompaniment. Trainings with these corps should count for commissions in the Army as in other Militia, and also an occasional commission in the Marines might be offered to these subalterns. The Permanent Staff would be provided by officers Royal Marines as Adjutants, and sergeants of the corps as Instructors, on the present Militia system. It might be necessary to provide dépôts in Scotland and Ireland for training recruits, on account of the distance from a Marine Division. They would be amalgamated with recruiting stations, and a Lieut.-Colonel Royal Marines appointed to command.

The Militia (or Reserve) companies would be about a hundred strong, and on mobilisation would come into the Marine Divisions, be amalgamated with the service companies, and be brought up to strength by pensioners and newly-joined "regular" recruits.

By such a system the raising of 35,000 Marines in the first year of war would be more than a possibility—it would be a *probability*.

#### ENGINEER CORPS.

For the cadres of these Reserve companies there might be available 4,000 pensioners and *depôt* men, about 2,000 firemen R.N.R., and 500 to 1,000 Reserve men who had served their first period; these are quite inadequate; and it is difficult to devise any means by which they can be satisfactorily increased, owing to the difficulty of obtaining sufficient recruits, even for the service companies. Every effort should be made to persuade the large number of men who leave the Service at the end of their first period to join a Reserve, and to induce firemen to join the R.N.R. in increased numbers. For the rest, the Marines would have to provide untrained reinforcements for all work within their reach. To officer the Reserve companies there are a few R.N.R. Engineers available, but not enough. No adequate reserve to the Engineer of a modern battle-ship is really possible, and the active list requires to be increased to almost meet war requirements. The most qualified Reserve are the best engine-room artificers, and many of them might be promoted to fill death vacancies.

#### CONCLUSION—PART I.

This finishes the outline of a scheme solving the problem set by the Essay, but it contains very much that is impracticable to carry out in our Navy at the present time, either on account of expense, or because it would be an injustice to existing classes, or because the Service is not ripe for the change; finally, the scheme could only be adopted by gradual development. Have, then, these many words been wasted? It is claimed that they have been useful, in that they indicate a method of evolution which shall at least have the effect of keeping the Navy up to date, and in that this first part represents the aspirations of many classes whose voices have little weight in our Naval Councils. Possibly other methods are better, and that the voices are crying for impossibilities; but in any case some of the reforms are immediately practicable, and these are further discussed in Part II.

Thus, at least, the arguments of the theorist have been of some utility in clearing the way for practical suggestions!

#### PART II.

##### SUGGESTIONS FOR PRESENT APPLICATION.

##### THE "EXECUTIVE" OR "MILITARY" LINE OFFICERS—ENTRY AND TRAINING.

The time seems to have already arrived when the present early age of entry into the Service should be abolished, and public opinion seems already ripe for this change.

The existing system has the following disadvantages:—

1. The boy is entered at too early an age to definitely decide on his future career for himself, and he often feels later that he has mistaken his

profession, and that his tastes and abilities, his inclinations or his pecuniary necessities, should have led him into another line of life. With this awakening he finds that his training has unfitted him for, or that it is too late to enter on, another career. The result is an embittered life and a bad officer. It is no longer essential that his physical training should commence at an early age.

2. A Naval officer should be a cosmopolitan, an educated gentleman with considerable scientific acquirements in addition to mere professional skill, and it does not appear that this result is aimed at in the right way. At an age when the mind should be allowed to gradually and slowly expand; should be grasping and thoroughly studying the rudiments of science and literature, the boy is placed in the hands of that great enemy of healthy physical and mental development, the "crammer," and he is tortured into a state fit for passing a competitive examination— an ordeal found too severe for many good men of riper years. This competition is, to a certain extent, lessened by the nomination system, which also appears obsolete. Surely all British subjects have an equal right to serve their country in any capacity, supposing that they are fully and duly qualified by some test which should be fair to all. These remarks do not apply to Service cadet-ships, which shows the country's gratitude for faithful service; and if the remainder were thrown open to competition, the number of these might be slightly increased. Similarly, colonial cadet-ships serve a political end in linking the Colonies more firmly to the Mother Country.

3. Is a training-ship the best place in which to educate very young boys? If so, then such ships as the "Conway" would send the most successful candidates at a later age, supposing the examination to be so arranged as to allow marks for the particular points of such an education; but this is no reason why such a school as the "Britannia" should be maintained by the State. On the surface, however, it would appear that the atmosphere of a public or private school ashore, where the boy is looked after entirely indoors and out by University men, specially qualified and selected with this object, would turn out a more satisfactory stamp of officer.

4. The literary training of the midshipman, too, after leaving the "Britannia," is not satisfactory. At the moment when his mind should be really broadening and strengthening its grasp, the boy is sent to a ship in commission, where he sees sights and mixes with associates entirely unfitted for his immaturity. His studies must also be, to a great extent, neglected, and his brain becomes narrowed into a professional groove at too early an age. The combination of the position of an executive officer and of a school-boy is an impossible one.

5. At the time when all boys, except those entering the learned professions, are quitting book-work, this acting sub-lieutenant is sent back to school again for a period all too brief, and he has scarcely settled down again to work after his roving life when he is asked to pass a scholastic examination; then, if he succeeds, so far as the Service is concerned, he is never compelled to look at a book again as long as



he lives, and in some cases, let us hope exceptional, apparently never does.

6. Then, also, the professional courses for preparing him for the remaining compulsory examinations in gunnery, torpedo, and pilotage, for the rank of lieutenant, are far too short, when they also are calculated to last a lifetime, and the standard of qualification is far too low when the professional importance of the subjects is properly considered.

The result is that the executive Naval officer has apparently laid himself open to the accusation of being the most illiterate officer in Europe: an accusation which happily, however, cannot be supported; yet, although many most highly educated officers are turned out by our present system, there is little doubt there is much to be desired in the direction of a greater study of other subjects; naval history, to give only one instance, may be mentioned. That he is an excellent practical officer at his own work is of course due to his early education, but the same standard might be arrived at, in combination with a more thorough education, if the entries were later and the examination an open competition.

Let the Public Schools have a chance, however faint, make fifteen-and-a-half to seventeen the limits of entry, and keep the boy at a dockyard college till passed for sub-lieutenant. Let him gain his first glimpses of practical seamanship and navigation on board vessels specially attached to the dockyard for that purpose; and his gunnery and torpedo by long and gradual courses at the dockyard schools. That is, vary theory and practice in the college till the youngster's training is complete, when he, say at twenty, will be still young enough to pick up a man-of-war's routine.

There is one more detail as regards the training of the executive officer, and that is the question of later education. Naval science is continually changing, and, however thorough the preliminary education may be, men soon grow rusty in the monotony of a disciplined routine. Many officers do go back to Greenwich and through revising gunnery and torpedo courses, but a certain minimum of professional knowledge should be compulsory for promotion to commander. The examinations might be passed at any time after promotion to lieutenant, and, if preferred, without going through the course, and separately in certain groups of subjects, or all together; but in each of certain fixed subjects all officers ought to qualify for promotion. Navigators might be excepted if they had no ambition to serve in any other capacity. The Greenwich, "Excellent," and "Vernon," courses would be arranged on special lines to cover those subjects considered most necessary. Probably some such step as this would have been already adopted, but for the scarcity of lieutenants. To get over this difficulty, those lieutenants who have not had a chance of qualifying, and who may be selected for promotion, should be promoted provisionally to commander, and complete their courses on the full-pay of a lieutenant, instead of going on half-pay as commander.

A suggested subject in the Greenwich course would be Strategy, and Naval History with Tactical discussions, so that men's ideas may be

cleared on these subjects. It is neither probable nor desirable that there would be universal agreement either as to the best weapon, or the best method of using it, but at least the attention of all would be turned to the subject, so that each would gain ideas which he might be able to put into practice in war.

This proposition appears to be putting extra work on the shoulders of the already overworked lieutenant, but, as a rule, the ambitious officer would hail a few quiet months ashore as a rest, especially when he knew it was counting for, instead of against, his promotion. There is very little fear at present of his becoming a theoretical officer instead of a practical one, and his skill in actually handling men and ships would naturally still be the predominating factor in his promotion. As a cadet at college he should receive most valuable instruction in handling torpedo-boats placed at disposal for exercises, singly and in flotillas, by day and night, and in trips occasionally lasting for a week. Similarly, when squadrons are exercising at steam tactics, it is suggested that the signal for lieutenants to exercise be made more frequently. After all, the control of the ship in the fight is the main matter in which his instruction culminates, and actual practice in charge is the only training.

Beyond this, gunnery is the only subject in which all should be equally skilled, for the gun is the principal weapon still, and pilotage, torpedo, and engineering may well be left to specialists. The ignorance of the naval officer in the law which he is called on to administer is frequently commented on, and this might be remedied by a short course either in the cadet or in the promotion course.

With the disappearance of the midshipman the gun-room would go, but the senior officers might mess with the captain on the plan already sketched. It is said that with the later age of entry there would be no candidates. With an open competition this statement is incredible, and in all human probability the competition would be as keen as for Woolwich, and with at least as good a class of candidates. It is more than probable that it is the early life in the gun-room which disgusts so many officers, more than the after-time as lieutenant. But no arguments will disguise the fact that more watch-keepers are wanted, so that more leave could be obtainable, and a lieutenant's life become more desirable.

*Entry, Training, and Distribution of the Seaman.*—The present system is most satisfactory in all respects, and the boy leaves the training-ship after his course as much educated and improved in the time as it is possible for anyone to be, and there does not seem to be any lack of recruits to raise the active list to any required number, for, in spite of the abnormal increase of the last few years, there has been no lack of candidates for entry, of as good physique, intelligence, and antecedents as can be required.

As already stated, a Navy manned entirely by such material would be all that the most ardent reformer could desire, but the expense of the training of sufficient numbers would be too prohibitory. £300 a head is a sum which no Exchequer could bear, and it is a useless extravagance when so much of the work of the modern battle-ship can be done as well

by men trained on a less costly system. The training of the boy is now, however, so good, that it is to be hoped that the present cruise of the "Northampton" is its last, though it is scarcely fair to condemn an incomplete experiment.

The pity of it all is that so much of the excellent material should be lost at the end of the first period of engagement. Possibly a great deal of this wastage might be averted by the improvements here suggested as regards the petty officers' position and pension. The question of feeding has been often raised, but the diet compares most favourably with any issued to either our own soldiers or the forces, naval or military, of any foreign Power. Still, an extra attention to dietary on the part of our military officers has resulted in a great improvement in this respect throughout the Army without extra expense, and, perhaps, something might be done on the same lines in the Navy.

The formation of a small Reserve from the men who will not re-engage is, perhaps, worth a trial. Even in the ninth year, after leaving the Service, they would still be a well-educated material, and could be kept at a good state of efficiency by the suggested drill when the schools are emptied for manœuvres. This Reserve might be reinforced by some of the men who purchase their discharge, part of the purchase money being returned on their engagement.

The work of the training squadron is no doubt excellent, and it would seem advisable, in the case of ships of all classes being commissioned at the ports for the education of cadets, that no boy should ever be appointed to a distant station until rated O.S., both on account of his health and to complete his training.

#### SEAMAN CLASS.—GUNNERY TRAINING.

With regard to the immediate improvement of gunnery training, there is a universal complaint from gunnery officers that the time spent in the schools is not sufficient; and particularly that revising courses for seaman-gunners are all too short. This is very true, if the officers' courses are also being cut down, and the gunnery efficiency of the fleet is to be trusted to specialists trained at the school; and it is probable that the specialist officers are now *indirectly* the cause of the present standard, which is too low, not as compared with the gunnery of other nations, but as compared with the possibilities of long-service men. This is a natural sequence of carrying in the ship a special gunnery staff, because everyone throws on them the *whole responsibility* of the training, and, however indefatigable they may be, the work is too heavy for them.

The Army has just completed the correction of a similar error, and now the company officers share with the adjutant the training of the men. The result has been a marked improvement all round, particularly as regards the officers themselves. Divisional drills are all very well, but more might be done by both officer and man, and that on the lines of field training in the Army. A regular course of gunnery should be carried out in each year by the officers of quarters, the men of the quarters being excused as much duty as possible during the course. It is true that

complaints would arise that there were not enough seamen in complement to carry out the deck duties, but more use should be made of marines. The advantage of the gunnery course suggested is that both officer and men would gain greatly from the association, the officer especially in finding, probably for the first time, what an excellent gunnery instructor he had it in his power to become; while the men, it has been suggested in many cases, would be agreeably surprised to find that their officer could teach them anything at all. Naturally the whole course would only last a few weeks, three perhaps, and every required assistance being given by the gunnery officer; and the captain would examine the class at the end, with a view to the capabilities of the officer as well as of the men, by whose efficiency the instructor would be judged.

#### PETTY OFFICERS.

The position of the petty officer in the chain of authority appears to require reform. The naval police should be abolished, and the petty officer be held responsible for discipline, and, as a consequence, be treated more as a class apart from the seaman. A corporal of marines can always be trusted to an extent which is rarely applied to a second-class petty officer, while a sergeant is looked upon as absolutely reliable in independent work. (Of course this confidence is sometimes misplaced, but, as a whole, the greater feeling of responsibility leads to good work, and it is undoubtedly better training for the N.C.O. himself.) Now, it is suggested that this superiority of the marine is simply due to the fact that he is a responsible factor in the chain of discipline, and that a corresponding reliability would ensue if the petty officer were trusted to the same extent. This plan has already been given a partial trial, and with a sufficient measure of success to warrant its continuance. To treat the first-class petty officer as different from the rest, they should be given a separate mess place, an advantage which would compensate them for the extra responsibility laid on their shoulders. The necessary room could be easily obtained, as the subordinate officers' accommodation would have disappeared.

As regards actual substantial increment for this class, the chief matter for reform seems to be a graduated pension for the chief petty officers; and to them also it would give a marked encouragement if a few of the many highly-valued instructors could be promoted to Warrant rank *without* examination, as a reward for long service. They would not afterwards, as a rule, be drafted to sea-going ships, but be retained for duty at the schools of the particular line in which they had served as instructor.

#### WARRANT OFFICERS.

The promotion of Warrant officers requires consideration from the following different aspects:—Firstly, the present most deserving and intelligent class require additional rewards; secondly, to give extra inducement for promising recruits to engage and make of the Navy a career; thirdly, as a reserve to the watch-keepers, and as a possible source of extra lieutenants both in war and in the present emergency; fourthly, with

respect to carpenters and the engine-room ratings, but this is discussed with the other civil branches later on.

*First Aspect.* Concerning this no remarks are needed, except to express sympathy with the "Earnest Appeal,"<sup>1</sup> which explains most clearly what the Warrant officers themselves require. Moreover, the Admiralty are said to be now giving their attention to the subject, so that in all probability by the time this Essay is finished a solution will already have been found which will give complete satisfaction.

*Second Aspect.* The increase of pension and the chance of added rank to the chief petty officer have been advocated as tending to make men re-engage, but, with a continually increasing establishment, it may be desirable to offer extra inducements for intelligent and ambitious boys to enter the Service, and when in to refrain from purchasing their discharge. This can be effected by regularly offering a small annual number of commissions in the Navy to the rank and file. If five such commissions were given in each year, and the average length of service as lieutenant were taken at fifteen years, there would only be seventy-five of these ward-room officers throughout the Navy, and they would be quite insufficient to in any degree alter the tone of the Service, or to have any fancied derogatory effect on the standing of the Naval officer. The maximum limit of age for such an examination would be thirty, and preparation for such a future would naturally be commenced by the boy as soon as he left the training-ship, full opportunities of self-improvement being placed in his way. The subjects of the examination would be such as to show his full qualification for the duties of the quarter deck. If, after gaining his commission, he again came to the front as a particularly efficient officer, he would, naturally, obtain further promotion; such a case is not likely to occur so often as to make any appreciable difference to the lieutenants' promotion question.

The discussion of this method of promotion of the Warrant officer leads so naturally to the question of the lack of watch-keepers, and the difficulty of obtaining more that this opportunity of going into the whole matter will be taken.

For peace work, even, we have not enough lieutenants to serve as watch-keepers; for war, we shall require double the present number. Naturally, the first solution of the difficulty which occurs is to increase the lieutenants' list till the necessary numbers are gained. A very pretty solution, but, apart from the direct increase to the Estimates, it fails by a long way to satisfy the requirements of the case. Promotion is now sufficiently difficult, and many good men have no chance of it; thus, it would be either necessary to increase the number of commanders, and therefore of captains, or to make the difficulty greater still. Moreover, the hardships of half-pay life are already sufficiently accentuated for the senior officers, and this would only lead to their increase. No, what extra money is spent must provide for watch-keepers, without increasing the existing lieutenants' list and the competition for promotion, if it is at the same time to satisfy the lieutenants and the framers of the Estimates.

<sup>1</sup> "The Earnest Appeal" on behalf of the rank and file of the Royal Navy.

We require about 150 more watch-keepers to adequately and generously perform the duties in peace. The Warrant officers' promotion would in time give half the extra number required, and the abolition of the gunnery lieutenants as a special class would give the remainder. (How their work would be performed has been already described, but it will be considered again in detail with the question of training marines.) Thus the extra number of watch-keepers are supplied with the very smallest increase to the Estimates, without blocking promotion, and at the same time satisfying the aspirations of two most important classes, and tending to the greater efficiency of the Navy all round.

The enormously increased number of lieutenants (about 1,000) required for war could in part be provided by the promotion at once of those Warrant officers who in the competitive examination for commissions have, though unsuccessful, attained a certain qualifying standard. Their names would be retained on a mobilising list in order of seniority. This class might provide about 100. The remainder would have to be supplied by such R.N.R. officers as were available, giving, of course, the first preference to those who had served a year in the fleet (nearly 300); and then more of the older Warrant officers would have to be promoted to supply still lacking numbers.

It scarcely requires any deep argument to prove that the Warrant officers as a class make better combatant officers than the R.N.R.; but comparisons are not pleasant, and both are excellent in their way. However, as regards the present emergency, it would appear that a large proportion of the places recently given to the R.N.R. might have been more fitly filled by Warrant officers. On the other hand, the R.N.R. officers are so highly deserving of encouragement in the work they are willing to do for the State, that this shows a suitable appreciation of their efforts, and the 100 places given to them will not make promotion more difficult. It is, however, to be hoped that there may be no need in the future for the repetition of such a wholesale entry, but that the Warrant officers and sub-lieutenants will give a regular supply equal to the demand. It is undeniable, however, that it was better to take them than further reduce the sub-lieutenant courses, and the sub-lieutenants' promotion was becoming too rapid. In fact, would not a longer time as sub-lieutenant be a panacea for one of the lieutenants' grievances, namely, that they hold the same rank and position too long! The major in the Army holding a position identical with that of the old lieutenant does not complain, because he remembers the long years he passed as a subaltern, and is content by comparison.

Although to revive the old navigating line in the persons of these R.N.R. officers seems a good suggestion, the step is a retrograde one, and, as regards steam tactics, they are no more fitted to be navigators than to be Line officers. It might be feasible if the navigating officer were to be reduced to a mere "navigator" and the officer of the watch were always to "carry on" at steam tactics. It would more thoroughly train the "captains of the future," and the R.N.R. officers would be essentially fitted for the work given them; but they would have a very easy life,

whilst giving more work to the already taxed watch-keepers. In fact, the present arrangement for providing navigating officers seems most suited to the general requirements, and can scarcely be improved on.

Before finally leaving the question of the R.N.R., the gist of what has been already said may be thus summarised. Although the idea of taking their *officers* wholesale on to the regular list has not been well received, and although the *men* who, in manœuvres, have served on board have not been well reported on, yet keep them on the present lines, and encourage them to the highest degree. It will do good to our national trade—maritime commerce—and can only help the Navy in war; unless the fatal error of counting on them as being available for manning the fleet on mobilisation is committed. It is an error because:—

1. The best of them will be required to feed the country and keep up our commerce by manning those merchantmen which it is necessary should keep the sea after the declaration of war.
2. Many of them will not arrive home, or within reach of men-of-war, until after the first decisive action.
3. The residue available may be absorbed in manning the merchant cruisers and transports required for troops.
4. The men required for the first fleet action should have received the very highest military training, in order to establish our superiority from the commencement, thus gaining the enormous moral advantage of a good beginning—an advantage upon which the very existence of our Empire is said to depend.

They require support because:—

1. A few of them will be available to reinforce our ships on foreign stations.
2. They are the best men for transports, not only in peace, but also to convey reinforcements to distant garrisons at the outbreak of war, and to carry the expeditionary force which it is to be hoped will end it.
3. To reinforce the fleet in a long war we shall require all the men we can lay our hands on, and as a Reserve they are the best and most suitable class of officers and men we can obtain for the purpose.

Before leaving the question of Reserves, it must not be forgotten that in war the Coastguard will have a high value at their stations for signalling and revenue duties, so that the men taken for the fleet should be replaced at the first opportunity.

#### THE ROYAL MARINES.—ENTRY, TRAINING, DISTRIBUTION.

Apart from what has been already described, the first immediate change required is an increase to the force gradually progressive till the present numbers have been doubled.

Time after time, in the last two hundred years, reliable men of all



descriptions have suggested a large increase to this corps, and for most varied reasons, though all advocating a most useful addition to our preparedness for war. Among duties, proposed in recent years, that the Marines should undertake are : the complete garrisoning of our dock-yard ports, the defence of the coaling stations, the providing of all Colonial garrisons, the instruction of Colonial forces, the whole work of the Garrison Artillery, the work of the Submarine Miners, the execution of small expeditions, and—most important of all—the provision of adequate crews for our fleet.

Although all the rest might be placed within their reach, our Naval need is quite sufficient for a very large augmentation to these ubiquitous forces. Perhaps the very variety of the  *rôles*  suggested has so far prevented any great increase of the establishment, but one reason is not hard to find. In time of peace the corps does its work of preparation very quietly, and, having no advocate in great authority, its usefulness is forgotten by the nation, so that it is only when dangers threaten nearly that its existence is remembered and valued. Then, whether the duty be to serve as police, or in the battery, as an advanced guard, or in the assault of a position, or a reinforcement to the fleet, it is to the Marines that recourse is first made.

In a recent comparison, made at the R.U.S. Institution, of the R.N.R. and Marines, the only advantage claimed for the former was that at least they were not sea-sick. Now, it is, indeed, rarely that a marine is incapacitated by sea-sickness after his first cruise ; but this may serve to point a direction in which his training requires amplification in order to make him more of a seaman. He is certainly taught how to pull a boat at present, but more and more attention might be devoted to the seafaring side of his instruction, not only in barracks, but more particularly in the ship. With this exception, the scheme of training of both branches of the Marines offers little scope for suggested improvement ; but, unfortunately, it is rarely that the scheme can be fully carried out, for the men are rushed off to sea before their drills are completed, and on disembarkation have little time to revise before they are required again. For this, the only cure is more men ; and, following on that, fresh arrangements for the skeleton crews. To accommodate the extra men, barracks should be provided close to the dockyards, so that skeleton detachments could be kept under the eye of their own officers, and could do their gun-drill, musketry, and field training, in addition to the work of the ship. Then, also, for new ships and those first for commissioning, an almost complete detachment with an officer might be told off, so that they could both be exercised at the guns of the ship, and grow accustomed to one another as soon as possible.

So far as it is possible to predict anything, good recruits would not be lacking for any reasonable immediate increase, especially if the free ration of bread and meat ashore were granted ; for the men, when embarked, do not suffer from the same lack of suitable position and employment as the officers.

Considering the growing difficulties of gunnery, surprise has been

frequently expressed that the Artillery has not shared in the recent increases made to the Infantry; and thus extra strain and shortened training has been the lot of a body of men who have been always considered as well worth a slight extra expenditure.<sup>1</sup>

Amalgamation of the two branches has many advocates, and certainly there would be a considerable gain in simplicity of organisation; but an essential of any scheme is, that the Infantry should be raised to the Artillery level. A scheme has been already sketched which should entail no increase of expense, but, in justice to officers and men, it can hardly be made retrospective; it would be necessary to commence with the latest entries alone. One of the advantages claimed is, that complete detachments might be provided from a single company; but something in this direction may be done on increase by bringing the strength of the companies of each corps up to the establishment already sketched.

On the whole, there seems to be no really important reason why amalgamation should take place at all; and by it the system of entry of officers would be much complicated. The stamp of Marine officer obtained from the Woolwich and Sandhurst examinations is an excellent one, and no Marine entrance examination would bring about any considerable improvement. However, to obtain an increased number of officers of this stamp by either method, all, or some, of the following improvements in pay or position might be granted to the Marines: direct representation on the Board of Admiralty; an active command for one General; at least, one appointment on the Staff of the Army (twelve Marine officers now serving have passed the Staff College); command pay for Lieut.-Colonels; armament or working pay for R.M.A. officers ashore. When embarked, to be able to award minor punishments to their own men to the same extent as, and without reference to, the "Executive Officer"; to sit on Naval Courts-Martial for trial of Marines; to rank as "Majors" earlier; Officers R.N. and R.M. to command one another according to seniority when landed; senior Majors to receive "flag" pay, and selected Marines to be employed as gunnery Staff officers, *i.e.*, replacing gunnery lieutenants, for charge of stores, examination of training classes, musketry, and such similar work, as could not be readily performed by watch-keepers. It is never supposed that subalterns embarked for the first time should be detailed for these duties, but there are some eighty Marine officers now doing at least their second tour of sea service (and a few more are available).

Further, it is not suggested that the whole of these eighty have either the energy, the will, or the training to now undertake the arduous Staff duties of a gunnery lieutenant; the change must be effected gradually, so that no hardship be inflicted on those Naval officers who have qualified, or who are about to qualify, in "gunnery"; and only those Marine officers who have, by passing an advanced course, shown that

<sup>1</sup> This has been done to a small extent in the Estimates for 1896, but many more officers and men are still required at Eastney to completely train the recruits and perform barrack duties efficiently.

they have both the necessary energy, training, and knowledge, should obtain these appointments. Thus, for some years to come, at least half will require to be filled by Naval officers, and always those Seaman officers who show such talents as to fit them for a post on the staff of the Gunnery Schools will have sufficient encouragement and employment to devote themselves to this work. It is only the second-class gunners who might be replaced, and they would probably gain promotion as rapidly by showing distinguished zeal in the promotion course, and in purely seaman duties. Promotion and work, too, is really made easier for the whole class by replacing lieutenants by Marines, and thus lessening competition.<sup>1</sup>

The Marines who can be considered as specially qualified at present for gunnery appointments are those officers of the R.M.A. who have obtained a first-class certificate in the instructor's course in the "Excellent," and who, therefore, have passed through identically the same courses and attained the same proficiency as first-class gunnery lieutenants. The officers of Light Infantry who have qualified in the same course would be available as soon as they have been through a course of torpedo, or for ships carrying a torpedo lieutenant. The one respect in which these Marine officers may be said to be not fully qualified by examination is, for command of boats at target practice. It is not an insurmountable difficulty!

The *national* argument in favour of the change is that many Marine officers have been educated to be highly efficient Naval gunners, yet they are embarked in the Fleet to perform duties which only occupy a few hours weekly of their time. This not only causes the officer to deteriorate, but gives no return for the money expended. Meanwhile, officers already trained to be good seamen are, at a considerable further cost, educated and appointed to take up gunnery work, while there is a great lack of officers to perform those seaman duties from which they are excused. In addition, the best Marine officers, feeling that no zeal of their own can ever give them either extra work or pay in the Fleet, and disliking the idle, irresponsible life, use their best endeavours to get Army appointments or other work ashore. It is not dislike of the sea, or of the ship, but of their position on board, which gives so many good Marine officers their distaste for sea service.

To better train more Marine officers for gunnery work, they might volunteer, after their first tour at sea, for the extra course at Greenwich,

<sup>1</sup> A letter signed "Major, Royal Marines," published in the *Times*, September, 1895, advocated this employment for Marine officers in very similar language, and met with considerable approval from many officers in both the Navy and Marines, also a letter from Major Gatliff, R.M.L.I., published in the *Times*, April, 1896, advocating the formation of Marine Militia, has attracted a good deal of favourable comment. I need scarcely state that neither "Major, Royal Marines," nor Major Gatliff had seen my Essay when their letters were written, nor has there been the slightest collusion between us, thus showing that I am by no means alone in advocating these considerable innovations. Marine Artillery officers have been frequently employed as gunnery lieutenants in the past.—*J. M. R.*, April, 1896.

already referred to, to be held for gunnery and torpedo specialists, and then go through gunnery and torpedo courses on the present lines. This work would count in lieu of any examination for promotion to captain and major. Officers R.M.A. might be permitted to pass the final Greenwich examination and a portion of the practical gunnery test without going through the course, if they preferred it. Necessarily all officers so qualified would be eligible for gunnery instructorships at headquarters.

As a rule, the gunnery pay given to Marines would vary from 3s. 6d. to 2s. 6d. a day, according to the qualification obtained in the examinations.

Torpedo schools for training Marines in both submarine mining and mobile torpedoes might be established at Fort Cumberland and Portland, but this is an extra outlay for which there is no pressing need at present.

#### "CIVILIANS" AND MISCELLANEOUS RATINGS.

Of doctors we have no sufficient reserve for war, but it is probable that the martial and professional ardour of young surgeons would be inflamed by a national emergency. Even now, with an increased Navy, there is scarcely sufficient work to keep the surgeon fully *au fait* with his profession, and an addition to the Staff in peace, therefore, is to be deprecated. In our large squadrons the practice of compulsorily retaining a medical officer on board each ship throughout every day has rightly undergone some modification as unnecessary, and possibly this relaxation might be further extended, so that after a long tour of service abroad surgeons might be spared to go through full-pay revising courses at the hospitals to bring them into touch with the latest developments in medical, surgical, and hygienic science.

That the accountant branch does its work well as a whole is not to be questioned, and the value of the professional knowledge of the Secretary is so great that it could only be with reluctance that the change advocated in Part I., as being more in accord with the advance of education and the good of the Service, could be carried out.

Probably the most pressing reform now required is the abolition of the terms "Civil Branch" and "Civilians," and to carry out this idea on the lower deck, not only nominally but practically, every rating possible should be supplied from the ranks of the Marines. Cooks could be specially trained, while armourers, blacksmiths, and all other trades, could be induced to pass through the few months' work in the ranks. Above all, the signallers should come from this corps, for their training serves a double purpose; and it is probable that most of the writers, stewards, and sick-baymen could be also efficiently supplied from the increased corps. Anyone who has practical experience of the office work of a Marine Division must know how efficiently all is carried out. In this way might be retained the very many good marines who now purchase their discharge to seek for advancement in the Army or in civil life. Whether after obtaining the special rating they should cease to be Marines is another question, but for purposes of musketry and other training it seems better that they should remain Marines—the colour of a coat makes little difference.

## ENGINE-ROOM COMPLEMENTS.

But if mechanics remain Marines for organisation purposes, they should certainly work under the Engineer, as also the carpenters and all trained shipwrights; thus the whole ship's company should be either seamen or marines or belong to the engine-room complement (the most important subject now left to discuss). The Navy might go without marines, and a very few lieutenants would suffice to keep the ship off the shore, but without engineers and engine-room complements there could be no Navy and no battle. Therefore, to ensure efficiency *here*, the most pressing attention is required. A *sufficiency* of stokers is the first need, and the mere voting of extra numbers will not bring about an addition, for sufficient recruits of good calibre do not present themselves. It is essential, therefore, that the attractions of this branch of the Service should be increased, and the best way to achieve this is by making the work less arduous; but until the numbers are increased this economical solution cannot be obtained; therefore, such suggested improvements in pay and position as the chance of Warrant rank and the additional 2d. a day on re-engaging must be tried, to enable the work to be made lighter and more interesting. The method by which the less arduous task and increased efficiency would be obtained is by the institution of comfortable depôts ashore, where recruits would be fully trained before embarkation, and where the older hands would have a period of repose after a foreign commission, when employed in the Steam Reserve. Although more men are required to commence this plan, they are only adding to our necessary requirements for war. The depôts would be commanded entirely by Engineer officers, and the instruction of the stoker would be arranged by them, so that the common complaint of captain and engineer as to the uselessness of stokers second class in their first ship would be attended to, and no man would be sent to sea until rated stoker.

This will have the double advantage of training the men on a settled plan and also lightening the work in the ship, and thus, as already pointed out, help recruiting. Whether musketry should be included in the subjects taught to the stoker is rather a question to be left to the Engineer officer. Undoubtedly the results at target practice are, and always will be, poor, but it follows the principle of making everyone a combatant.

In a similar manner to the stoker, the E.R.A. class might go through a systematic course before embarkation, and distinctly should have large opportunities of gaining Warrant rank on passing a qualifying examination. The machinery of small vessels could then be placed under one of these Warrant officers.

## ENGINEER OFFICERS—ENTRY AND TRAINING.

The work of the Engineer officer is already of vital importance, and more and more will the efficiency of every part of the ship, and of every weapon of defence and offence, depend on his talent and skill. There is, therefore, an urgent growing necessity that these officers should be the very best obtainable. Hence, in no case should the training at Keyham be

reduced below the five years which was adopted some years ago as an irreducible minimum, and no more temporary service or direct commission Engineers should be admitted, so that all precautions may be taken to ensure that no one is entered without having received the highest training possible. There is, however, a slight difficulty to be overcome, namely, that while more Engineers are required in the Service, an insufficient number of suitable candidates present themselves for the entrance examination for Keyham. Evidently, then, the same cure is required as in the case of the stoker, and like that case the cure would very probably conduce to greater efficiency with little added expense. The Service must be made more attractive till the required number and class of applicants present themselves; and the first change is the important one of making Engineers "Executive Officers," at any rate to the same extent as the Marine. Allow the senior engineer of the ship, under the captain, to have complete control over his own men, and, aided by a writer, keep the books connected with their Service. Also, similarly to the Marines, they should be directly represented on the Board of Admiralty, so as to have an authoritative voice in the creation of the Navy of the future. Engineers should also be appointed to the Staff of Admirals and to the N.I.D., and, as just suggested, they should be given the command of the Engineer depôts. All these things might be given at once, and would probably have the required result. When more officers from Keyham are entered the Service will thereby be rendered more agreeable, and so re-act favourably on the competition, but if even then the numbers are not sufficient, the question of their pay may require consideration. As a small boon, students on leaving the college might be commissioned as assistant-engineers at once, without having to undergo the probationary period surely unnecessary after five years' training.

As an additional temporary relief to the stokers, an endeavour should be made to induce firemen R.N.R. to serve for a short period in a man-of-war. Engineer officers R.N.R. should also be invited to serve. It appears to be erroneously assumed that these officers are a fully-trained Reserve to the Navy, but they have no practical acquaintance with hydraulic gun-gear, or with torpedoes, and many other engines necessary in the fighting vessel, yet not used in the Merchant Service. Therefore, courses in the "Vernon" and "Excellent" are much to be recommended to make them efficient. On the other hand, the fireman, when "disciplined," appears to be of the very highest value, and this class should be increased to its utmost limits.

As a further temporary relief to the engine-room complements, to enable the suggested changes to be carried out, a certain number of deck hands, marines, and bluejackets, might in each ship be temporarily employed as stokers, but only bad shots should be selected for this work, as the work in the stokehold seems to have a permanent bad effect on shooting; therefore, if there was any general desire to avoid the duty, the remedy might have a good effect on the shooting qualification.

Lastly, on this subject, there seems to be no reason why the stringency

of the medical examination on stokers as regards eyesight should not be much relaxed, for mere short-sight in a moderate degree would not impair the efficiency of the man. Similarly, men rejected from the other Services, or found unsuitable from eyesight disqualifications of this nature, might be asked to transfer to the stoker ratings.

#### TRAINING ESTABLISHMENTS.—KEYHAM.

In the training of Engineer students at Keyham, there are one or two suggestions which seem worthy of consideration; for instance, the complete construction of a dynamo might be included in the work, together with the actual winding of an electro-magnet; and also some instruction in the practical moving of heavy weights in confined spaces, together with knotting and splicing, very much on the same lines as the repository instruction of the R.M.A., might be added. An engineer on a foreign station has very frequently to estimate the cost of repairs, or show some knowledge of the cost of work and materials, therefore some elementary ideas on this head might be given at the college; and, lastly, at least one foreign language might be included in the curriculum, having regard to the necessity of translating many foreign works on machinery, and communicating with foreign engineers, both for the higher education of the young officer himself, and for the service of the Intelligence Departments.

#### EDUCATIONAL ESTABLISHMENTS.

*The Royal Naval College, Greenwich.*—Although this institution has done much to raise the educational standard of the Navy, yet as a place of instruction it is undoubtedly capable of improvement. In the first place, the college is badly situated for the education of very young officers. It is too close to London, and has no counter-attraction in the shape of suitable recreation grounds to keep the physical energies in a healthy state of development. Therefore, in the case of acting sub-lieutenants, new to an officer's leave and privileges, possibly just returned from a long commission abroad, and fresh to all the experiences of "town," it is surprising that they do any work at all! It is certainly an important ingredient of an officer's education that he should have some acquaintance with the capital of the British Empire, but the time for the instruction is scarcely well chosen when it runs concurrently with a determining period of his life's career. These remarks do not apply in their full force to the second-lieutenants of Marines, who are younger, are under closer personal supervision, and join with fresh enthusiasm. Hence, although many more suitable situations for their instruction could be obtained, there does not seem sufficient reason for alteration, unless the college were to be entirely removed, and this is hardly to be recommended, on account of the expense of the transfer; but, if possible, the embryo Seaman officers, as already suggested, should be educated at a dockyard port. Thus, the Greenwich College would be retained principally for the higher training of older officers, as for them the nearness to London could have no disadvantage. The line which the education of these officers should



follow has already been indicated. A regular promotion course in professional subjects alone for all officers of each Service. Languages, physics, chemistry, and mathematics would be voluntary subjects, except that to take a first-class in gunnery or torpedo for either Naval or Marine officers a certain standard in mathematics, chemistry, and physics would be compulsory.

A staff of officers would be required to act as professors and lecturers, and these should count time as in a ship-of-war at sea. For instance, a captain or commander of highly proved ability would be required to lecture on strategy, and hold the tactical discussions. Even as things stand now, the Marine Staff requires an increase, as latterly *all* the young Marine officers go through the college in two annual batches, and these fifteen to twenty officers cannot receive individual attention from one professor who has in addition the sole responsibility of instructing the Navy in Field Fortification, Topography, and Minor Tactics. The two former subjects are of little importance to the Naval officer, who has already quite enough to learn, but the ordinary dispositions for security in camp and on the march, and the simple principles of attack and defence, should be known to every officer, more especially by the Gunnery Lieutenants, who are the only instructors of "Minor Tactics" to the Navy. With Marine officers acting as "Gunnery Staff," lectures on these subjects might be given from time to time in ships in commission for the benefit of all. This step would have been taken before now if the initiators of the first movement for ships' lectures had received encouragement or patronage. This, again, merely accentuates the fact that, to teach anything to either officers or men, the courses must be compulsory.

*The Royal Naval College, Portsmouth.*—Necessarily, with the introduction of the new system of entry, this institution in its present form would disappear, but a cadets' establishment would require to be constituted in its place. Merely criticising the *existing* institution as a place of training, it must be unhesitatingly condemned. The college at Greenwich has at least the advantage that in its mess the behaviour of the whilom midshipman is modified by the example of his superior ; but at Portsmouth the still "acting" sub-lieutenant sinks back again to the status of the gun-room. While the subaltern in the Army at the same age is receiving his finishing training on lines admirably suited to the purpose, the acting sub-lieutenant, trusted in nothing, and hampered with the restrictions of a school-boy, is apparently tempted to act as such. Surely the cure is evident. Treat him as a commissioned officer, and at the same time form a general mess in gunnery and torpedo schools, where he, like a subaltern, will come under the direct influence of his senior officers, who, as well as instructing him, will then see that his general behaviour is such as to bring credit on the establishment.

*The "Excellent."*—As the gunnery schools have already been discussed, and their staff are so indefatigable and painstaking in their efforts to bring about good results, only a few suggestions remain to be made,

The present "short course" would naturally be replaced by the "promotion course," and the "long course" by a special one for Naval and Marine officers who take a first class in the promotion examination.

The training now given to sub-lieutenants would be given to cadets, who should be marched to their work like the men, and taught the proper discipline which is inseparable from good drill.

The appointment of a Marine and an Engineer officer to a responsible position on the regular Staff is a suggestion for immediate application, and even of urgent necessity, when the number of both classes who go through the school is considered, and since the drill emanating from the "Excellent" affects the "gunnery" training of Marine and Engineer alike. The Engineer is already there, and the work of the Marine Staff Officer is clearly defined—to superintend the training of Marine officers and N.C.O's going through the school, who now, from the moment they arrive to the moment they leave, are oppressed by the feeling that they are nobody's children, and that whether they learn anything or not is a matter which concerns themselves alone. As an alternative, the military tactics instruction might be given here instead of at Greenwich by the Marine Staff Officer, and he would be able to assist in bringing out drill-books, so that the good and applicable points of military works might be inserted.

*The "Vernon."*—Of the torpedo schools, except that the "Vernon" courses should be modified on similar lines to those in the "Excellent," there is nothing but good to be said. Here, also, it would be good if the Naval and Army submarine mining arrangements could be brought into closer touch.

#### CONCLUSION.

More officers, more men, more ships (and, therefore, greater expenditure) are the needs of the Navy to-day, as they have been in all times. In most of the schemes suggested here, every attempt has been made to provide the increase as economically as possible without loss of quality, and that must be the true aim of every naval reformer—an economical increase of good, highly-trained material, equal not only to peace work, but capable of coping efficiently with the higher requirements of war.

It has been shown that of Seamen and Marines, both officers and men, we could obtain as large a supply as the country wills; that the bluejacket for all-round work is rather the better man, but that at the same time he is by far the most costly; that also the marine serves a double purpose, and could be made to serve a treble one in linking the armed forces of the Colonies more closely to our own, and so aiding the cause of Imperial Federation; hence a large proportionate gradual increase to the Marines has been suggested.

For the executive Naval officer a higher, more advanced training has been asked, and more responsible work in the fleet for the Marine officers, in order that this corps may become more fully part and parcel of the Navy.

In order to keep the engine-room complements efficient, it has been pointed out that higher privileges for both officers and men are required to attract sufficiently good material to the Service.

Having regard to the advance of education, the fitness of the Warrant officer for a commission is noticed, and also that combatant officers and men are quite capable now of performing clerical and accountant work. With this, also, is connected the principle that everyone borne on board the fighting machine should be trained to fight.

A plan is sketched for providing the extra men who would be required throughout a European war, and its total rightly includes, as one of its most valuable items, the officers and men of the R.N.R., yet it is demonstrated that other arrangements should be made to supply the complements for first mobilisation.

Many existing institutions have been unfavourably criticised, yet the closest examination has not disclosed anything really bad, and at times it has been an effort to suggest improvements. In fact, the excellence of many of the old ideas has caused a misgiving as to whether the new could bring about amelioration. Probably this hesitation is inseparable from all honest criticism, but strong expressions are required to force into notice the small flaws in long-existing arrangements. By criticism alone can perfection be obtained, and when the numerical inferiority of our Naval and Military Forces in comparison with the armaments of foreign Powers is considered, we should be satisfied with little less in the *personnel* of our first line of attack and defence. By skill alone can we overthrow *les gros bataillons* of our enemies.

Finally, it is not only the Navy which requires extra training, but the whole population of our world-wide federation; and in all its schools should be taught the history of the year 1805, with its beginning and its end, with the events which led up to it, and the Empire which followed! With such fuller knowledge the "federated" Governments would not be allowed to rest content until they had assured an organisation so complete, that when war at length arrived, each man in its hierarchy would proceed with cool, determined energy to do the work for which his whole life's training had prepared him; and so vast, that against a combination of even the fleets of the whole world we could launch an "Armada" which should make "Britannia" once again supreme Mistress of the Seas, and place her children in a position worthy of the man who taught the lesson of Trafalgar.

## THE TACTICS OF THE FUTURE.

By Lieut.-Colonel W. A. H. HARE, Royal Engineers.

*A Review of Captain F. Hoenig's "Untersuchungen über die Taktik der Zukunft"; with numerous extracts, taken by permission.*

## PART II.

## STUDIES IN MILITARY HISTORY.

(Continued from page 452, No. 218, Vol. XL.)

## PSYCHOLOGICAL CONSIDERATIONS.

Hoenig says:—"The victories of Frederick the Great over half the armies of Europe were due not only to his superior military genius: they were due as well to his tactical system and the way he knew how to turn this to account, based as it was on the soundest of principles—an intimate knowledge of human nature. Whenever he lost sight of this, as, for instance, at the battle of Kollin, his grenadiers were driven off the field, in spite of their iron discipline, just as was the 38th Brigade at Mars-la-Tour. On this subject the Great King spoke his mind out without reserve—as, indeed, he was wont to do on most matters—and he was undoubtedly sound in his opinions. Hence his constant success. His army was animated with a consciousness of military superiority which great generals alone inspire, and yet the King wrote in his secret instructions to his generals: 'The Prussian soldier is, as a rule, indolent, that is to say, he will do little or nothing instinctively, but must be driven.' The King never forgot the fact that no man is particularly anxious to get killed, and that the instinct of self-preservation is, and always will be, strongly developed in human nature, and his remark as regards the Prussian soldier, applies to many of our men to the present day. Now, if we bear this in mind, we can come to some kind of approximate conclusion how much self-sacrifice may be reasonably expected from the soldier, and what there remains for military discipline and the personal example of officers to accomplish. The essence of all this is: we must find some system by which the individuals that have been described as indolent may be given a certain military value."

The author has no faith in addressing German soldiers in high-flown language, and thinks that, as a rule, it falls flat on them, as they are not sufficiently susceptible. On the majority of them the only thing that has any effect is deeds, not words. He quotes the Great King as rewarding

on the spot every gallant act and bold enterprise in order to quicken ambition, and influence the rank and file by the energy and bravery of their officers, but he coupled this at the same time with an iron discipline. "The King was successful," he says, "in his offensive tactics mainly because he fully realised that a stop or pause in the attacking movement amounted to a check, if not a failure. He never encouraged halts for rest, even to gain breathing time, but did everything to avoid them. From his tactics was evolved the high sense of duty of the Prussian officer, which, together with the development of his resolute bearing, is the mainstay of our military strength to the present day. It was the result of his training. The moral effect of a heavy fire is, as a rule, more destructive than its physical. This will be more than ever true with improvements in rifles and artillery, and the tactical system which produces the moral weight of superior leaders must be, *celeris paribus*, better than others. In the days of Frederick's linear tactics, the losses of the assailants at decisive points of the battle-field were as heavy as in those of Napoleon's column tactics or in those of the present day, which are a combination of the two. The King's system was based on a discipline as strict as that of the ancient Romans, and his generals were as courageous as were theirs. Fire and movement were one and the same thing, and the soldier only discharged his musket by word of command. Ranks were kept as closed up as possible, and fire was reserved till close to the enemy (about 200 paces), but it was then delivered with a rapidity previously unknown. The principle, then, which the Great King carried out in his own peculiar way of 'bringing as many muskets as possible to bear on the enemy, and then crushing him with a well-delivered fire by word of command,' is what many tacticians of the present day are still striving to arrive at. Compare, for instance, the 'Midsummer Night's Dream.'<sup>1</sup> Still, the leading principle upon which the system is based is the same to the present day, that is to say, very heavy losses must as a matter of fact be incurred in every attack which is meant to act decisively, and it thus practically amounts to a question of who can stand most killing."

The following are the remarks of the author on the subject:—  
 "The traditional instinct in the Prussian Army of always acting offensively is a legacy which has been inherited from the Great King, and it is one that should be fostered all the more, seeing improvements in modern firearms. His tactical system was based on the weak points of human nature, and was sound enough for the time in which he lived. We are too much inclined nowadays to lose sight of such considerations, and look on the soldier as a portion of a vast complex piece of machinery, and expect him to do his share of its work just as if he were not a human being with all its weak points. We may take Meckel, indeed, as the advocate of one extreme school which insists on the preservation of closely-formed 'shooting machines,' with all its physical impossibilities, and the other extreme school as representing theorists who base their

<sup>1</sup> By Colonel Meckel, now of the Great General Staff, Berlin.

ideas on the moral superiority of the rank and file; and the adherents of the latter school are the more numerous of the two. The advocates of the former insist that the soldier should be a shooting machine, that is to say, that the officer must be expected to do everything; those of the latter, on the other hand, base their suppositions on the assumption that the rank and file are heroes to a man, which is of course absurd."

"There is one factor, however, in the question that must always be reckoned with, and that is the *human instinct of self-preservation*. All others are nowhere in comparison when real danger has to be faced and it is a matter of life or death. But this is exactly the sacrifice the military leader has to call for, that is to say, the highest that the human being is capable of. Consequently, his power and influence over the men he commands must be maintained at any price, and if temporarily impaired, at once re-established. The officer can only thus command his men, and cannot otherwise be held responsible for the execution of the orders he receives."

"The conditions required are of the highest order, but these—among others, courage amounting to contempt of death, determination and energy, training of military spirit, feeling, and bearing—can only be expected of professional soldiers, and not of Militia; in other words, of a permanent highly organised body of officers imbued with the best professional spirit coupled with intelligence, and devoted to King and country—in fact, animated with those feelings which are only produced by sound education, a high moral tone, and a proper view of the responsibilities of life. These first make a man of the officer, and afterwards raise him to a position above his surroundings. Any really sound system of tactics must mainly depend on moral factors such as these. They are, however, only developed to the extent required in the individual when he has reached the age that enables him to fully understand the meaning of the expression *responsibility*. The latter makes a man reflect, offers him an inducement to work, raises his professional tone and sense of duty, gives him an object to strive for and obtain, and turns him, in fact, into a man of action, provided he is of intrinsic value, integrity, and fidelity. On the other hand, we generally see men of weak character shrink from responsibility of any kind; instead, indeed, of arousing in them any signs of determination it seems to have rather the opposite effect. Thus, in all matters in which the intellectual faculties are called upon to exert themselves for any specific object, especially when accompanied with great personal danger and responsibility, strength of character is of the first and foremost importance, and it should be invariably reckoned with. For though this trait in human nature is, as a rule, when very strongly marked, rather born than made in the individual, still it is quite possible to cultivate and develop it, though perhaps only to a limited degree in the average man of the right sort, by training and inducement based on common sense and knowledge of human nature. One of the best means to this end is the use of brilliant examples of deeds renowned and conspicuous for valour and devotion to duty in war, the contemplation of the development of the

requirements of progress and education, and the habit and practice of self-denial in the material prosperity, luxury, and pleasures of the world. Now this means a life devoted to one end—delight in work, for, after all, this is the only real, lasting pleasure the world affords us."

"The feeling of *duty* and consciousness of responsibility are again chiefly together the means of arousing our intellectual faculties, and really honest work only begins with a sense of responsibility. Responsibility makes us reflect. Sound reasoning, however, is perhaps the greatest task that can be imposed on human nature, especially if it is to be of a lasting kind. It is devoid of enervating effects; it is invigorating. It appeals to the brain which governs the nervous system, and triumphs even in cases when it has to deal with physical weakness. Responsibility again leads to that inward reproach of shame which is such a powerful lever in overcoming the hesitating moments of the weak."

"I have seen men who were incapable of rising to the occasion, and I have come to the conclusion, from experience and careful observation, that there are many men to be found who, being of an inferior stamp, carry their heads all the higher from a guilty knowledge of their own defects. Presumption is born of ignorance; modesty is the result of sound training and education. When I look back on the many terrible ordeals I have survived, and by no means wish to pretend that they did not give me the 'creeps,' I still have since quietly enjoyed the satisfaction of having been able to overcome my weakness and conquer the shady side of my own human nature. I may, indeed, say that I got the better of such feelings, though I do not for a moment pretend that I am of above the average courage. Now, if I might describe what it was that enabled me to get the better of myself on such occasions, I should certainly say it resulted from two factors—understanding thereby producing a sense of duty, and responsibility producing the fear of shame. I have made a psychological study of myself to endeavour to honestly ascertain what my feelings were at the time—whether I was master of my intellectual faculties or otherwise, etc. I have looked upon this as a kind of exercise which for me has had a certain attraction or charm, but I have come to the conclusion that any kind of end to be gained by a study of the sort is wearisome in itself, that it constantly refers the student to the question *ab initio*, and that any result is impossible unless one's intellectual faculties have been accustomed to be absorbed in the same groove from the very outset."

"I am inclined to attach less value to the impulsive character of youth, though it may, as is well known, have led to certain brilliant results, than to the reasoning power of mature age. And I base this on the fact that in the latter the intellectual faculties are more fully developed. The energy of youth, in fact, and the volition of women are in many cases, to my mind, very closely allied. Human nature is, however, unfortunately, as it is, too prone to ridicule far-reaching theories, and the more highly developed intellectual faculties of mature age should be always careful not to ignore the requirements of the day, and to consider what is reasonably to be expected. This should be constantly borne in mind, in



order not to nip too early in the bud the ideas and hopes of the rising generation."

"I might almost say that I should like, now that I am of a certain age, to once again go through a war on a large scale with its terrible scenes of slaughter, merely to see the different effect it would have on me compared with what it had when I was younger. I flatter myself I have not lost my head in more than an average amount of terrible scenes, and I have seen many officers who were quite equal to the occasion, and who excited my admiration at the time in words I cannot now express. Still, I must admit, I have seen others who were the reverse of this. I have also seen many of the rank and file whose conduct and bearing have similarly filled me with the highest admiration, and gallant fellows such as these I have a greater regard for than for the best of officers."

"I cannot say for myself that I have ever felt any particular animosity against the foe, or that my feelings have ever been worked on by hopes of reward. But I have always felt a kind of indescribable attraction of a higher kind, I think, and that is, to try and grasp the situation, to keep my eyes and ears open, and to watch the doings and behaviour of my personal friends around me, my regiment, the enemy, etc. For to me the study of human nature has always been, and is still, the most instructive of all lessons, and I have found that human nature is always more or less subject to change even in the case of men whom I may at once rightly describe as brave to a fault. Now, assuming that I am myself only a man of the ordinary average sort, and yet maintaining that I have, nevertheless, always managed to keep my head under trying circumstances, I say that this is a proof that the same average moral strength of character can be arrived at by careful training and education in all men whose natural instincts are not foreign to the subject—officers and men alike. Of course this applies more to the former than the latter, but deficiencies in this respect should be visited as regards officers without any regard to personal considerations. Still, we Germans appear, to a certain extent, to have wilfully neglected such distasteful measures, intoxicated as we have been with our uninterrupted series of military triumphs. But no real justification can be found for neglecting measures of the kind, and it may easily lead to very dangerous consequences. Much, indeed, has been passed over and concealed in Germany from false motives of regard for certain individuals of rank and position to avoid investigation and publicity. This may have been justified from motives of policy, but certainly not from a *military* point of view!"

"We must, indeed, not under-estimate the effect of the sense of shame on the feelings of the higher or governing classes in Germany. It was this that acted as such a powerful lever in arousing the country in 1813 to its sense of national disgrace, and it was this that made Prussian officers then sacrifice their lives so recklessly for the liberation of their country. But this sense of shame was the result of the inward contemplation of the terrible disasters the country had undergone, and the position that Prussian officers had thereby lost in the estimation of their countrymen, in the ranks of society, and as an intelligent body of men. Sense of shame

must be considered a living factor—a working reality—and if events that entail disgrace on the country have no effect on it, any attempt to arouse feelings of a higher kind is in vain. Now, feelings such as we have alluded to were of the kind which prompted the ancient Romans to their known spirit of retaliation. If, then, a member of a community is content with the peace and security which reign within the four walls of his house, and cannot see further, his sense of national pride inevitably gets dull, and so does his feeling of national self-assertion. Publicity, like everything else, it is well known, has its weak points; but as war is an undertaking in which the faults, like the virtues, of the individual man soon come out in their true light, penalties as well as rewards are things that should be equally recognised as necessary. This is all the more to the point, seeing that fear of punishment, rather than hope of reward, has a powerful effect on men of an inferior stamp. I have myself observed more than once that certain men whom I have had to deal with, and who were conscious of their personal defects, openly showed that they were ashamed of themselves when in fault, though they may have been men of quite, or perhaps even more than, the ordinary average. On the other hand, I have met others who, under similar circumstances, have looked at me askance and avoided me, and who apparently could not look me straight in the face. Can it be argued for a moment, then, that sense of shame does not act on human nature as a powerful lever, and is not one that should be made full use of?"

"If an army can only recruit its rank and file from the dregs of society, the officer, from his higher moral and social position, must mean everything, and the soldier in battle be looked on merely as a shooting machine under his orders. But history has shown that in the case of a reverse these shooting machines, even under the leadership of the Great Frederick, collapsed, and the loss of a battle was, as a rule, then merely a foregone conclusion. For the parts of the machinery having once broken adrift, their driving power refused to work; in other words, the men ran away so fast and far, that they could not be persuaded to again face the enemy. In his writings the Great King has, in fact, given us instances enough of this. But if an army comprises the whole manhood of the nation, as is now the case on the Continent of Europe, the connection between officer and man is naturally of a much closer nature in every way; and what was formerly arrived at by corporal and degrading punishment, and the strictest application of rules and regulations, is now a thing of the past. Officers must nowadays take a much higher view of their calling, from the very fact that they now can claim to belong to a highly intelligent and educated class, and this fact should always be clearly and distinctly kept in view. The very best rank and file that could be found in a national army can never cause the difference between officer and soldier to entirely disappear; it can only cause it to be modified."

"Thus, it is a great mistake for tacticians to again fall back on the formations of Frederick, or on those that were so successful in the attack

of the 14th Division at Probus—Bor (battle of Koeniggraetz, 1866), simply from the fact that they can see no other way of bringing troops to the front in sufficient strength to decide the action. Again, it is equally wrong to give up any idea of keeping troops in formation on the battlefield, and leave everything to the individual soldier, for under these circumstances there could in the first place be no possible direction or control of the forces engaged; and secondly, the greater majority could never be induced to go sufficiently far to the front, from the very fact that from the outset every man would be left more or less to act for himself, and would take care of himself accordingly."

"To actually fight in close formation is now a thing of the past. No sensible man can dream of such a thing. Anything like a serious engagement must inevitably lead to the fighting of swarms of skirmishers on either side. It only remains then to be seen whether, this being universally admitted to be the correct view of future battles, we are sufficiently prepared with preliminary ideas and measures on our side to ensure success. Fighting thus in swarms of skirmishers must naturally deprive officers of power of control and leading to a very great extent, in fact the absence of order, inseparable from fighting of the kind, tends to make their influence disappear altogether. There can be no doubt whatever on this point in the minds of officers of and below the rank of captain. There is, indeed, no use in trying to suppress the evil. Rather, should steps, based on common sense, be taken to check it only; but these must be founded on the recognised conditions of modern warfare, on the intellectual training of the soldier, on the excellence of the regimental officer, and on as large a proportion as possible of subaltern and non-commissioned officers to the rank and file."

"Fighting under modern conditions requires more reliable subaltern and non-commissioned officers than was formerly the case, but this is exactly the weak point of the huge armies now raised by universal compulsory service."

#### THE TACTICS OF MARS-LA-TOUR ON THE 16th AUGUST, 1870.— PSYCHOLOGICAL CONSIDERATIONS.

The author begins by stating that before proceeding to critically examine the events connected with the engagement of the 38th Brigade at Mars-la-Tour on the 16th August, 1870, he would ask the reader to refer to the description he has already given of the events that occurred. He says:—

"The subject is a painful one, but it should be gone into, nevertheless, so that we may not be led astray by false ideas and impressions, but come to a correct conclusion of the circumstances that actually occurred."

"The 38th Brigade had marched from Bingen to Pont-à-Mousson in ten days, and, in spite of the great heat, had stood the test remarkably well. While on the march news was received of victories on all sides, so that the rank and file looked forward with perfect confidence to meeting the enemy. I have, however, no belief in the feeling among troops of

'burning to meet the enemy.' It is simply ignoring the fact that human nature prompts the man to preserve, and not sacrifice, his life. But in the case in point the shameful declaration of war had exasperated the country and its ruler to such an extent that there was only one opinion and feeling, and that was that the King had rightly declined to comply with the insulting demands of a foreign Power. Consequently the German Army was worked upon by the strongest spirit of love of home and country, its feeling of patriotism was raised to a white heat, and it was prepared to meet the foe with the most powerful passion that could animate an armed host. Every man felt himself personally called upon to do his best, and the splendid marching powers and brilliant fighting qualities displayed by the troops justify us in believing that the feeling of national resentment should be considered as a powerful factor in the military training of an army. The feelings of the general were those of the soldier, the sentiments of the nation were those of the army, and to such an extent indeed did this universal spirit prevail, that the closest and most intimate enthusiasm permeated all ranks to a degree, it might be said, previously unknown in a victorious army. History has shown, however, that though feelings of the kind have sometimes accomplished great results, they have at other times met with failure; and this should be borne in mind, and act as a warning not to put too much implicit faith on national enthusiasm."

"The battalions of the 38th Brigade reached the battle-field on the 16th August, 1870, with an average strength of 900 bayonets—a marvellous feat of endurance, when we come to think of it; for if we compare this with the usual rate of casualties on the march in peace or war, from malingersers and footsore and weakly men falling out, it must be admitted that the feeling of determination on this occasion must have largely contributed to overcome physical distress. It was, in fact, this admirable spirit pervading all ranks that enabled fatigue, exhaustion, and night marches to be overcome, and bad and irregular supplies of food to be put up with. But the spirit of determination required in battle, when every conceivable kind of danger to life and limb has to be faced, and every man must feel that he is risking his existence, must be of a very different and of a far higher kind. A dogged determination to resist the effects of fatigue and exhaustion on the march is one thing, but the spirit required to face the dangers of the battle-field is quite another. The same man who perhaps will march till he falls in his tracks on the road will refuse to leave cover and face a hail of bullets, call upon him as you may by shouts or whistles, by words of command or orders, or by the repeated examples of the most devoted bravery of his officer. Even the non-commissioned officer who very likely from long service with the colours may have gained the reputation of being an excellent soldier, and has, perhaps, received certain marks of distinction for bravery in previous wars, but who is perhaps entrusted on the day of battle to carry high that sacred emblem of military pride and faith, the colour of his battalion, will be found to be lying flat on the ground with it, once out of sight of his officer, and not raise it till reminded of his duty by the stirring words of command, '*Fühne hoch.*' After all, this is only human nature, and can we expect

anything else? The fear of death is powerful enough to completely change the character of most men in a moment, and at times cannot be resisted even by the bravest."

"Any man who has to lead troops in action must have a knowledge of human nature, and should never forget that there are but few men he can reckon on compared with his own feelings. Again, he should carefully bear in mind that nerve, courage, determination, manliness, and devotion to duty are not always present in the same degree, at the same moment, in the same man. A man's moral courage is liable to be affected by various causes; among others, sights and sensations, mental and physical affections, etc. It can neither be reckoned on as the same to-day as it may have been yesterday, nor indeed to-morrow as it may be the day after. To be prepared to meet death calmly and resolutely is perhaps the highest demand that can be made on human nature. To expect this from all men and at all times is impossible. It is against the natural instinct of self-preservation."

"Now, in dealing with tactics from a psychological point of view, we must remember that we cannot reckon on a uniform high standard of human intellect, for not only does this vary very considerably among men, but it is subject to variation in the same individual from one moment to another. I might, for instance, make up my mind to undertake and carry out, without the slightest hesitation, to-day what to-morrow I might look upon in only a half-hearted way. And I think this is the case with very nearly every officer. At any rate, when it is not the case, the man in question is one of exceptional strength of character; he has, in fact, overcome human weakness. Fanatical spirit and ethical determination can both accomplish this; the former, however, is inhuman, but the latter ennobling. Again, the former, if it could be aroused, is a serious danger to military training and discipline, and is, therefore, impracticable; but the latter is, perhaps, the most precious and perfect ideal basis of a sound tactical system, only it is very sensitive, and a ticklish subject to deal with. We may, however, make our minds easy on this point, for we shall have to get up very early in the morning to find it."

"To attain, practically, what theory lays down as necessary is a very different affair. The reader will certainly agree with me that the men of the 38th Brigade went into action animated with as high and as soldier-like a feeling as it is possible to expect from the rank and file. More than this, they were fully prepared to meet the *psychological moment* (as he calls it), and this is a rare exception."

"No man can pretend to understand such matters unless he has lived with soldiers, shared their dangers, and watched and studied their peculiarities on the battle-field. Now, in the case in point, they were fully animated by everything that is possible to excite bravery and devotion to duty, that is to say, the cause of the war and the feeling not to be behind their comrades who had already won such a series of brilliant victories. Thus the men of the Brigade went into action bent on gaining a name for themselves, and even the most uneducated private, I believe, had a kind of dim prospective that

he was not going to fight for any kind of vain military glory, but was engaged in a national struggle for the independence and existence of his country. We should not lose sight of this. But now let us see: Was the Brigade imbued with this spirit up to the moment of giving way? And, again, was it still sufficiently imbued with the same kind of spirit to afterwards show in retreat *a bold front to the enemy, or even try and offer resistance?* I say: *No, it was not!*"

"I am not ashamed of owning," says Hoenig finally, "that the French fire of Mars-la-Tour affected my nerves for months after the battle. Troops that have survived an ordeal of the kind are, for a considerable time, demoralised—men and officers alike—and I am not the only man who says this. The Russian General Skobeleff, who must be admitted by all who are not biassed to have been a man of rare energy and personal courage, says, after the third assault on Plevna: 'We stormed and took the enemy's works, but the attack cost us less than the retreat. Officers and men were completely demoralised by the terrible fire. Whether the object to be gained is worth such sacrifices is a matter well worth considering. The best army in the world can be demoralised.' But the losses of Skobeleff's troops at Plevna were not so great as those of the 38th Brigade at Mars-la-Tour. Now, no sensible man, we think, will deny the soundness of such a conclusion; but narrow-minded vanity may. It would be useless to try and convert the latter. Courage which is not innate very soon evaporates. It is said of Skobeleff that he consulted a fortune-teller before the war, and she foretold that he would come safely out of it. He wore, it appears, a talisman, and thoroughly believed in it. It would not be the first case of the kind that has occurred, for one of the finest characters in military history—the Emperor Trajan—did the same. To many minds this may appear weak, silly, superstitious, and unchristian-like, and may be so, in fact. But, on the other hand, what does it matter, as long as it has the desired effect, that is to say, make a man insensible to danger and not know what 'fear' means?"

#### REMARKS ON THE FIELD OF BATTLE AND THE ENEMY'S STRENGTH.

"We could see nothing," says Hoenig, "of the Xth and IIIrd Army-Corps East of Mars-la-Tour, but four batteries in action West of the Bois de Tronville. On the other hand, standing on the height 780, South of the Vionville—Mars-la-Tour road, we could see from horseback the French position stretching from the height 846 to beyond Greyère Farm, and could even distinguish a large group of mounted men on the former. These were General Ladmirault and his staff. Their artillery, in action at intervals between long lines of infantry, were firing on Mars-la-Tour and the 4th Cuirassiers. It was difficult to estimate the strength of the French, but there could have been no doubt we had a Division in front of us, for the air was clear and the sun shining brightly. It was 4 p.m. when the 38th Brigade moved off."

"A general," says the author, "who at a peace manœuvre would make a frontal attack on an enemy whose strength he knew nothing whatever of, and who afterwards found out that he was attacking a terribly strong

position held by an enemy in vastly superior numbers and far better armed than his own men, would be sent about his business on the spot. But in war we cannot judge things in this way, for on certain occasions so many circumstances may occur and so many things happen that may neutralise superiority in numbers and armament, that the assailants may often have a very fair chance. But in the case in point no such favourable circumstances could possibly be reckoned on. The enemy were fully prepared to receive us in deployed lines, and, at any rate, in the case of Grenier's Division, in covered positions. So the chance of a surprise or a favourable circumstance of the kind was out of the question. The French position was indeed so strong that it might almost be taken as the type of a position to be in future selected on account of its natural strength for defence. A gently sloping and perfectly open field for fire in front up to extreme rifle range, and two obstacles, one within mean rifle range—a depression consisting of a strip of meadow land, some 300 or 400 paces wide, and separated into plots divided by wire fencing—and the other, a ravine close at hand, made the position practically unassailable. Of this our leaders knew absolutely nothing, though the ground had been in our hands the whole of the forenoon."

"Now," he goes on to say, "if we may take the French position as a typical one for the action of the modern small-bore rifle on the defensive, we may take the action of our cavalry on the occasion as exactly typical of what it should not be, the issuing of orders on our side as faulty as it is possible to imagine, and our system of obtaining and transmitting intelligence as bad as possible. Far-reaching reconnaissances, and the correct and rapid transmission of intelligence obtained, are in future of more importance than ever, and let us hope that the failures and omissions on this occasion on the German side will be looked upon as valuable lessons."

Hoenig says that, according to the most recent investigations, Grenier's Division was 7,750 bayonets strong on the 16th August before the action, but when attacked by the 38th German Brigade he admits it had no longer quite this strength, as it had taken the offensive previously, and been driven back by the Germans to the heights of Bruville; but he evidently thinks the losses involved by this were slight. The 38th Brigade went into action 4,400 bayonets strong only. Cissey's Division, he says, was 8,350 bayonets strong, and it only came into action when the German defeat was an accomplished fact. About half, he reckons, of this Division, or some 4,175 bayonets, came into action against the 38th Brigade. He thus calculates that there were on the French side some 11,925 bayonets opposed to the German 4,400. The former, again he points out, were on the spot, and came into action together, whereas the latter only arrived in dribbles, and could do nothing till within close range of their adversaries, owing to their inferior rifle.

Again, he points to the enormous superiority of the French in artillery, though he says nothing of their inferior field gun, which is hardly fair. The artillery of both French Divisions, and their reserve artillery as well, was in action, he says, when the 38th Brigade crossed the Vionville—



Mars-la-Tour road, that is to say, sixty guns, and adding to these two batteries of mitrailleuses, seventy-two guns. Now, on the German side, he points out, there were only thirty-six guns against these.<sup>1</sup>

"When the Brigade," says Hoenig, "was formed up to the South-West of Mars-la-Tour, its flank was so exposed that it was almost at right angles to the enemy's position. The cause of this may be said to be the fact that the objective given it was Tronville, but this is no excuse. Then the order was given to attack, and the Brigade had, of course, to make an immense change of front or wheel, and this should have been carried out before any advance was made against the enemy. But it was not, as I have already pointed out, and I have already alluded to the hurry and disconnected nature of the movement. Thus, to the ignorance of the strength and position of the enemy and of the ground, was added another evil, viz., *engaging the enemy before being formed in position*. Now, as this long change of front was being executed, the Divisional General himself ordered the 1st Battalion 57th, when some 2,700 yards from the enemy and South of the Vionville—Mars-la-Tour road, to extend two-thirds of two companies (the 1st and 2nd) as skirmishers, and the latter company was actually taken in hand by the General himself, and got mixed up with the 16th Regiment, as shown in sketch No. III. The advance, in fact, was a crossing and intermingling of units, the attack itself a disorderly rush, and the men were done up long before they got near the enemy."

"According to the official account of the war," he says, "all five battalions crossed the ravine, but I maintain that only eight companies did so, and the French met the advance of the Fusilier Battalion 16th, 1st Battalion 57th, Fusilier Battalion 57th, and the two companies of Engineers, that is to say, our right wing, with such a strong force posted on the Northern edge of the ravine that these three-and-a-half battalions never got nearer than 80 or 100 yards from its Southern edge.

The author says it is not enough to assert this. It must be proved. And he proceeds to give details of his personal experience of what occurred. Some of these are interesting, others not; but they mostly point to the bravery and devotion of the German officer and the inferiority of the German soldier as what we might call a "fighting animal." And on this point we might draw attention to a similar opinion held by May, the author of the "Tactical Retrospect," and Meckel, the author of the "Midsummer Night's Dream." Both these writers raised a storm of indignation in Prussia, especially the former, but it was afterwards acknowledged they were not far out. May wrote anonymously of his experiences, etc., of the war of 1866, and it would have fared ill with him had he been discovered. He was killed at the battle of Amiens in 1871.

<sup>1</sup> The author alludes to an incident which occurred in February, 1871, at Chers, near Tours, when General von Schwartzkoppen had just resumed command of the 19th Division. The General said on that occasion, on recognising him as having been adjutant of his battalion at Mars-la-Tour, "that was a terrible business at Mars-la-Tour; but who on earth could have imagined the French were in such strength!"

Hoenig says, however, in alluding to his personal experiences at Mars-la-Tour, that he would draw particular attention to certain facts because they are instructive ; that is to say, that, though the German losses were undoubtedly severe up to the time that the attack failed, there was no reason why resistance could not have been offered to a French advance. "But why did we not hold our ground?" he says. "Because we were thoroughly surprised, so much so, indeed, that the men, having lost their officers, lost their heads as well. And the French were no better than ourselves. They were unable to seize the opportunity, for they were absolutely without any kind of discipline or leading. Had the French pushed on after us, instead of remaining to plunder the killed and wounded, the Brigade would have been practically destroyed, and it could have been stated in the history of the war that five brave German battalions advanced to the attack up to a certain point, but afterwards nothing was seen of them. It would, indeed, have been a very good inscription to have been placed on a monument erected on the spot."

"The French," says Hoenig, "halted in the position we had left some 80 or 100 yards South of the ravine" (where he was lying wounded). "After a time I saw Grenier's Division pass by, first one line of skirmishers, then another, and next battalions deployed in line. The first line of skirmishers were keeping up a wild, rapid fire, and the remainder followed as a mob."

"All were shouting," he says, "*courage, courage, en avant!* but were busy plundering the killed and wounded, nevertheless, instead of pushing on. This was the moment when they were charged by the 1st Prussian Dragoon Guards."

Hoenig says he cannot say for certain how long the French remained South of the ravine, for time flies, he adds, very fast on such occasions. "It may, however," he observes, "be pointed out that the French never got into Mars-la-Tour, which was set on fire early in the action, nor did they get further South than some 150 yards or so of contour 780 East of the village. General von Voigtz-Rhettz, who had seen the collapse of the 38th Brigade, at once ordered the Brigade of Dragoon Guards to attack the enemy; but the 1st Dragoon Guards were only on the spot. This regiment skirted the village of Mars-la-Tour on its Eastern side, and charged the French infantry. The latter was thrown into a state of confusion, but, nevertheless, remained plundering the killed and wounded, and trying to carry off wounded and unwounded prisoners. But the French fire completely ceased for a time, and the 38th Brigade could perfectly well have been assembled and retired in order."

"A circumstance then occurred," he says, "which led to the most disastrous consequences. The Brigade-Adjutant rode wildly along the front shouting 'Retire on Thiaucourt!' I raised myself as well as I could to see round me, and heard nothing but piteous cries: Why this order? I then gave up everything as lost. Both regiments had, in fact, lost nearly all their officers, and the men retired, some on Tronville under Lieut.-Colonel Sannow, but the greater portion under no one in particular on Thiaucourt, and only rejoined the colours at noon on the following day."

This shows, says the author, the importance of giving an order properly; for, instead of giving the order quietly to such officers as could be found, the adjutant shouted wildly, "Retire on Thiaucourt!" several times. General von Schwartzkoppen gave the order, so it appears, but when General von Voigtz-Rhetz heard of it he countermanded it, and ordered what remained of the Brigade to assemble in the direction of Tronville; but, says Hoenig, "it was too late. The men, having lost their officers, were streaming too fast to the rear."

The repulse of the Brigade was the most terrible thing that happened to the German arms in the war. It lost 53 per cent. of its strength, and the proportion of killed to wounded was as great as three to four. Besides, the murderous fire of the French seems to have had a terribly shattering effect on the nerves of even those who were unhurt. The great heat of the day, the long and fatiguing march, and, finally, the attack and bloody repulse did its work. Hoenig describes the appearance and look of the strongest men as something awful, some crying like children, others utterly collapsed and speechless, and many in whose expression one could see signs that they were for the time bereft of reason. "A few squadrons," he says, "of the enemy's cavalry, and what would have happened? We should not have saved a single man of the Brigade."

We have no space to go into the details of his experience. He quotes certain very calm, cool, and brave acts on the part of individual German officers, but it all tends to point to the fact that German soldiers without officers have little or no fighting instinct in them, and they have to be led, if not driven, nowadays just as was the case in the early days of Prussian military glory under the Great Frederick. He makes, however, one significant remark, and that is, that no man was known to have thrown away his arms. This really points to the fact again that the German is a splendidly disciplined, if not a natural, fighting animal. There was no *saute qui peut*, no *débâcle*, no *débandade*, as would have been the case with the French.

"In the evening, under cover of darkness," he says, "fugitives from the 38th Brigade turned up at the spot where we have said the 2nd Battalion 57th, etc., were left as a guard to the transport of the Division. At 10.30 p.m. the column marched off to Thiaucourt and reached this place, which had been entirely abandoned by its inhabitants, between 3 and 4 in the morning. It then received an order to return to the scene of the conflict. It marched off between 6 and 7 a.m. on the 17th, and when the General commanding the Xth Army Corps saw what remained of the Brigade, the tears ran down his cheeks. On the evening of the 17th the Brigade was assembled to the South-East of Tronville. No battalion could muster more than 300 men."

The conclusions the writer comes to are really a repetition of what he has already stated. He went over the battle-field, it appears, in November, 1870, and again in 1876, and verified what he maintains from graves, etc.

Now, however, he says, the French Government has exhumed all the

bodies and re-interred them in the cemetery of Mars-la-Tour, where lie, he adds, the bones of 4,000 men, who died for their country on that terrible day.

The author gives the losses in the minutest detail, which it is not necessary for us to repeat. Briefly, they were as follows :

*16th Regiment :—*

Killed ..	..	27 officers, 526 men.
Wounded ..	..	21 „ 787 „
Prisoners ..	..	1 „ 356 „

Total, 48 officers and 1,313 men killed and wounded, and 1 officer and 423 men missing, of whom 1 officer and 356 men were taken prisoners, giving a total loss of 49 officers and 1,736 men killed, wounded, prisoners, and missing (1 officer and 356 men were given up by the French on the 25th August, the remaining 67 may be therefore reckoned as lost or dead).

*57th Regiment :—*

Killed ..	..	6 officers, 230 men.
Wounded ..	..	18 „ 423 „
Prisoners ..	..	1 „ 26 „

Total, 25 officers and 679 men killed, wounded, and prisoners. This gives the total loss of the Brigade as 72 officers and 1,966 men killed and wounded, and 2 officers and 449 men prisoners and missing, or a grand total of 74 officers and 2,415 men. The two companies of Engineers lost but 1 officer, and 8 men killed and wounded, the Divisional Artillery lost 44 men and 40 horses, and the 1st Dragoon Guards 14 officers, 82 men, and 204 horses, killed and wounded.

These numbers vary with those given in the official account of the war, but the author strongly maintains that his numbers are correct.

On the French side the losses, he says, were :—

Grenier's Division ..	..	14 officers, 343 men, killed and wounded.
Cissey's Division ..	..	85 „ 1,117 „ „

The total losses of the French IVth Corps d'Armée, including Legrand's Cavalry Division and the Reserve Artillery, were, according to French sources : 147 officers, and 1,722 men, against 200 and 2,258 previously given out. This may be accounted for by the way in which the returns were made out at the time, *i.e.*, including missing, etc., that were afterwards accounted for.

Hoenig next draws attention to the many mistakes and omissions in the official account as regards the description of the scene of the conflict, especially as regards the wire fencing near Mars-la-Tour, and the bank and hedge near the ravine, close to which one-fifth of the Brigade, he says, were killed and wounded. The account, he points out, only mentions the wire fencing as having acted as an obstacle to the 1st Dragoon Guards, and nothing is said of the bank and hedge at all !

The author devotes a chapter to the question : "*How ought the 38th Brigade to have attacked ?*" He goes into the subject in the minutest detail, in which we are not inclined to follow him, as it is based on the theory that the French would act again as they did, and that the

Germans knew the ground and the strength of their adversaries, which they did not know. It is, consequently, pure theory. He is certainly right in saying that the two companies of Engineers should have placed Mars-la-Tour in a state of defence, and that the Brigade should have deployed and formed up before it ran its head against the wall in what the French would call *petits paquets d'hommes*; and, again, he is right in saying that a battalion should have been kept in reserve in Mars-la-Tour. He says the German infantry should not have gone further than contour 780. He would have formed them up on height 795 in two or three lines of companies, with two companies and a battery in first line, their flank resting on the Bois de Tronville. He admits they could not have done any harm to the French at this range with their inferior rifle, and his object would have been to entice the French to attack. If this did not succeed, he would have sent a battalion forward to seize the hedge he has referred to some 100 yards South of the ravine, and another battalion on the left flank, where it could have advanced under cover. This is, of course, assuming on his part that he knew of the existence of the hedge and cover, which he did not know. Probably these battalions would have been annihilated, but he is certainly right in maintaining that the action of the Germans should have been a defensive or expectant one alluring the French on, when they would have been received by the Germans with five-and-a-half battalions and a fortified village. Yet he calls it an *attack*! Had the French really attacked, it might have been a very different affair. Anyhow, nothing could have been a greater failure as it was. To launch a small force against an enemy in superior numbers infinitely better armed and holding an exceptionally strong position was what the Germans tried to do, and it naturally failed signally. The Brigade disappeared from the battle-field just as if the French had killed, wounded, or taken prisoner every man, which indeed they might have done.

#### OBJECTIVES OF THE FRENCH AND GERMAN ARMIES.

Hoenig points out that the French halted in their retreat from Metz to repel the Germans, and then wanted to continue their movement to the rear. The latter, he says, was necessary from the general state of affairs on their side, and he adds: "That a capable French General could, under the circumstances, have gained a tactical victory over the Germans at Mars-la-Tour is beyond all doubt. The French IVth Corps d'Armée had only to push forward at 5.30 p.m. on the 16th in the direction of Tronville to have assured this, for there was not at that time on the spot a single German battalion capable of offering any serious resistance, and the French were at least 15,000 strong. It would have gone hard, indeed, with such German troops as were on the ground. But whether a tactical victory of the kind would have led to anything of a decisive nature in the war may very well be doubted, seeing the positions of the XIIth, IXth, VIIIth, VIIth, and Guard Corps of the Germans. It should not, indeed, have been the object of Marshal Bazaine to have gained a victory of the kind, but rather, having thrust aside, as indeed he did by 5 p.m. on the 16th, such German troops that tried to impede his retreat, to have

continued to retire on every available road. And this he could perfectly well have done unmolested till noon on the following day (the 17th), for up till then the Germans were unable to interfere with him. Bazaine could thus have got a start of some 20 miles. Whether he could have joined MacMahon, however, would have depended on the marching power of his troops. He may, indeed, have been very badly informed, but he must certainly have realised the fact that, though he might have beaten off the Germans on the 16th, he was sure to be shortly afterwards attacked by them in very superior numbers."

For, South of Metz, he points out, the Germans were marching Westward on a broad front, there being nothing to oppose them, and this strategic movement on their side should not be lost sight of when examining the situation. As he says: "Bazaine's retreat had been stopped by a desperate fight, his plans were upset, and, as the result of the fighting, he decided to withdraw to the protection of the fortifications of Metz. This, we know, sealed the fate of the Army of the Rhine."

"Now, had the French," he says, "been determined to gain a victory, that is to say, re-take and hold the battle-field of the 16th, as well as the road Vionville—Mars-la-Tour, it was clearly the business of the Germans to prevent them doing so, and await reinforcements to enable them to fight the matter out. How this could have best been done is, of course, impossible for us to say, as it must have entirely depended on the attitude of the French. On the one hand, a strictly defensive attitude on the part of the Germans would certainly not have succeeded, but, on the other, desperate attacks might have left them too weak to hold and defend long enough the ground they might have gained at tremendous sacrifices. Take the case of the 5th and 6th Divisions, for instance, though we must remember that after 4 p.m. they were unmolested by any forward movement of the French."

"In a battle," says Hoenig, "we may generally be right in assuming that the enemy is trying to do what we should ourselves attempt were we in his position; and in the case in point, the object of the French was to gain a tactical success on their right wing. Consequently, to defeat this should have been the aim of the Germans. But to allow themselves to have been driven off this part of the battle-field was exactly playing the Frenchman's game, and to have stood on the strict defensive would, on the other hand, not have sufficiently fixed him on the spot."

"The Germans then," he says, "should have taken the offensive, it is true, but with due regard to their inferior strength. This was not done. The 20th Division practically made no attack on the enemy at all, and the 38th Brigade was annihilated, unsupported, on the strategic, and, consequently, decisive point of the battle-field. The order for the Xth Corps to attack was right, under the circumstances. The actual carrying out of the order, on the other hand, he adds, was another affair. The idea that the French could have been driven from their position extending from height 846 to the Farm of Greyère was, considering the German forces available, out of the question."

We would again point out here how much we should have liked to hear the author's explanation of the inactivity of the 20th Division, but he tells us nothing whatever on the subject.

#### TACTICAL CONSIDERATIONS.

A Brigade of five-and-a-half battalions will, the author thinks, rarely, if ever, be called upon again to attempt what the 38th Brigade tried to do at Mars-la-Tour. "It may, indeed," he says, "be taken as a rare example of the kind to illustrate this or that view of tactical formations best suited to the offensive. But there is one thing that cannot be ignored, and that is, the 38th Brigade carried out its attack until it actually reached and got mixed up with an enemy more than double its strength in rifles and guns. It followed the direction given it by the Divisional General with rare precision, as an isolated body, and quite unsupported. And whatever may be said as regards its failure, it certainly did what no other body of German troops succeeded in doing against the French Imperial Army; that is to say, it managed to advance in force over a perfectly open field for fire in antiquated tactical formations."

The author gives an interesting account of how unprepared the Germans were to meet the superior armament of the French infantry and its altered tactics. Count von Waldersee, military attaché in Paris, he tells us, warned King William in a report dated 18th July, 1870, on the new French method of fighting. It was circulated in the Army, but it was too late then to reform the German offensive tactical system. "I remember well," he says, "Colonel von Cranach's words to the assembled officers of the regiment during mobilisation in 1870, when impressing them with the importance of company training. 'The French,' he said, 'will not attack us, but receive us in long deployed lines. They will let us attack first, and after that advance. They have abandoned their shock tactics, and taken to fire tactics. Their new rifle is the cause of this. You must consequently practise your men in vigorous attacks, and close with the French, so as to make up for the inferiority of our rifle by getting over the ground as fast as possible.' The advice he gave was sounder than anybody at the time—including, perhaps, the speaker himself—fully realised, and we soon found out how correct it was."

There was, indeed, he goes on to say, a general opinion in the German Army before the war that the company column tactics then in use were not calculated to meet the fire of the French Chassepot. The declaration of war found the Germans, he adds, in the act of looking for new tactical formations, and their infantry took the field, knowing the inferiority of their rifle and their unpreparedness to meet the altered conditions of attacks on a large scale.

"We knew," he goes on to say, "that we should be received with effective rifle fire at long ranges, and that we should have to cross a certain zone of fire without firing a shot in reply, suffering in the meanwhile very considerable losses. Rifles since then have been greatly improved, but the fact remains the same in the main, that is, the assailants, if they are to attack and drive the defenders from their position



must push forward to within effective range—that is to say, 600 yards or so, and nearer according to circumstances. *How* this is to be done and *how* the enemy is to be brought to close action is, of course, very different now than was formerly the case, but the *principle* remains the same. The French were the first to use long range infantry fire in the war of 1870. They had been previously trained to rely on it. Now, the French had by no means selected their positions on the 16th August beforehand. Rather were they forced to fight against their inclination, and it was purely accidental that most of the positions they fought in gave them every advantage as regards their superior infantry armament. It is to their credit that they turned the natural strength of the position they occupied—from height 846 to the Farm of Greyère—to such excellent account, and it may well be asked whether in future any troops could advance over such ground to the attack as did the 38th Brigade on that occasion.”

We may expect a still more destructive fire from modern small-bore rifles, he says, but not, he thinks, at much greater ranges. The assailants, he points out, could not be more heavily handicapped than they were on this occasion, and it is an excellent example of the kind. It has been shown, he adds, how unpractical was the handling of the 38th Brigade. Its action, however, he maintains, affords us an excellent lesson on modern tactics.

The rest of the chapter is a somewhat tiresome repetition of what the author has already stated. Briefly, the French held a position with two Divisions numbering 11,925 rifles and 72 guns (including twelve mitrailleuses). The front was some 2,500 metres long, giving them five men to the metre run, neglecting Legrand's Cavalry Division. The Germans immediately came under a ceaseless fire of every description from two tiers on crossing the Vionville—Mars-la-Tour road at ranges varying at first from 1,500 to 2,500 metres. And this fire continued without a check till the French infantry advanced. At first the independent firing of their skirmishers could be distinguished from the volley firing of their formed companies, etc., but soon the whole merged into a tremendous independent fire.

He calculates that the whole time taken by the Brigade in the attack, reckoning from the time when it marched off from its position South-West of Mars-la-Tour, did not exceed one-and-a-half hours. At 5.45 p.m., the *débris* of the Brigade were being got together South of the Vionville—Mars-la-Tour road. He puts the expenditure of ammunition at between 18,000 and 20,000 rounds. He thinks the French must have fired some 954,000 rounds. The *data*, however, on which he makes these calculations are very vague and uncertain.

The last chapter of Part I. the author devotes to the question, “*How is it the charge of the 1st Dragoon Guards succeeded?*” and this is interesting, seeing how much it is the fashion to maintain that cavalry can do nothing against infantry armed with the breechloader.

He begins by saying: “All that I personally saw or heard described of the behaviour of the Austrian and Saxon troops in the war of 1866

only went to prove their excellent military bearing and discipline on the battle-field. The Saxons especially kept their formations, and maintained discipline under a murderous fire to a remarkable degree, and only gave way when completely defeated. Again, when temporarily successful they showed no evidences of wild hatred or passion, and wounded and unwounded prisoners alike were safe in their hands from injury or insult. They never lost their high soldierlike bearing, nor did they break from their tactical formations. But we experienced something very different on the battle-field of Mars-la-Tour. We had, I admit, before the war, a certain respect for the military virtues of our old adversaries, and did we not know that the French nation boasts to march at the head of civilisation? We consequently had anything but a low opinion of the military bearing and discipline of the French Imperial Army, but this was soon rudely dispelled. I would pass over the whole question in silence were it not instructive."

"Now, we see such things," he adds, "very differently when reading and writing quietly at home, than when lying wounded on the battle-field. Certainly having experienced the latter sensation may make us prejudiced, but this does not mean to say that errors and misconceptions connected with the former may not be rectified by a little practical experience of the kind. There are some who maintain that the French Imperial Army were tactically superior to the German; among others, certain distinguished Austrian authorities, and even Germans, do not deny that in fire tactics, as well as in village fighting, the Frenchman showed a superiority over the German. Now the German infantry committed many tactical errors in the first period of the war, we admit; but how did it fare with the French when they tried the offensive?"

"When the 38th Brigade had been wiped off the field," says Hoenig, "the French came on first with one entire Division, followed by half a Division, formed in several lines. There were no German infantry in front of them capable of offering any kind of resistance, and yet their advance was as clumsy and as slow as possible. First came a line of skirmishers pushing and shoving along in the greatest confusion and disorder with every man yelling, and yet it constantly halted, though meeting with no opposition. Then came another line, and after this deployed battalions with the eagles. I could see very little more. The French artillery made no attempt to accompany the infantry in its advance, but remained in its original positions, with the exception of one battery of Cissey's Division, which pushed forward as far as the Northern edge of the ravine that has been so often alluded to, and thence opened fire on Tronville. The first line of skirmishers were firing mostly from the hip, very few indeed taking aim; both lines passed over us, and halted where most of our killed and wounded were lying, that is, between 150 and 300 yards South of the ravine. The distances kept were so unequal that the two leading lines of skirmishers were in many places mixed up and practically formed one line. The French may indeed have got within 170 yards or so of contour 780 when they were charged by the 1st Dragoon Guards, but I cannot say for certain." The scene that

ensued baffles description. Both lines of skirmishers bolted, some threw away their packs and rifles, some lay flat on the ground among our killed and wounded, and others tried to form rallying groups. These groups fired in every direction, except the right one, added to which the closed battalions blazed away furiously as well. That three squadrons of the 1st Prussian Dragoon Guards actually rode through three lines of French infantry, putting two to flight, and throwing the other into utter confusion, thus really defeating all three, seems incredible, especially when we remember the odds against them and other unfavourable circumstances under which they were charged."

"This brilliant exploit," continues the writer, "has been described by many, but *the reason why it succeeded has never been fully explained*. I think I can explain it, and it is simple enough. Now, I say that had the French infantry possessed any kind of tactical training or military discipline, no cavalry could have possibly had any chance of success, seeing that anything like surprise should have been out of the question, the scene of the conflict being bare and open. Still, the French were completely surprised; they lost their heads, and were thrown into utter confusion. This gave the dragoons their chance. But why were the French surprised? Now, let us see: in the first place most of the French fired without taking any kind of aim; and, secondly, the 13th and 43rd Regiments, on the left flank of Grenier's Division, turned sharply in a Westerly direction on Mars-la-Tour, thus forming an acute angle in the French front, and partially masking its fire. They thus exposed their flank to the charge of the dragoons, and their rear to the fire of the German 79th and part of the German 57th in the Bois de Tronville, and to that of the German artillery in action South-West of it. This tactical blunder on their part was one cause of the success of the German cavalry, but there was another. This was the utter want of military training, discipline and order, and of good military bearing and feeling on the French side; there was besides the helplessness of the French officers in trying to lead or handle their men, and the neglect of keeping any observation on the action and movements of the enemy. All this favoured the German cavalry."

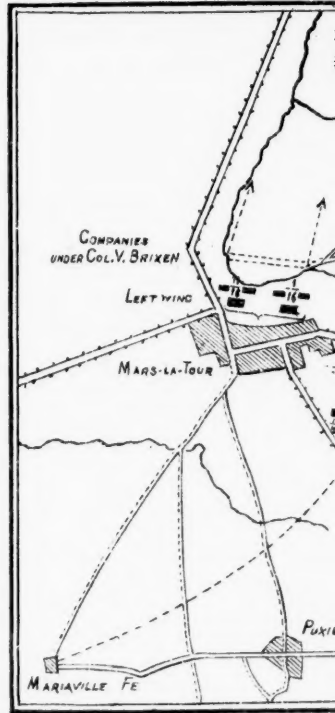
Now, Hoenig gives a very graphic description of what he saw when lying wounded on the battle-field of Mars-la-Tour. He says: "When the skirmishers of the French 13th met those advancing directly to the front, it seemed as if it were an occasion to celebrate victory which had hitherto deserted the French side. There may have been a certain justification for this, but the French should have remembered that victory was not yet quite so certain after all. They shouted, congratulated each other on their success, drank each other's health from their flasks, waved their caps, and heaped every kind of abominable insult and injury on the wounded Germans. They disgraced the name of Frenchmen by the way in which they behaved to the German wounded, and their vile and filthy acts are in some cases indescribable. Most of us were first of all greeted as we lay on the ground with the muzzles of their rifles, then we had our coats, etc., torn open and ripped up to seek for money and

valuables, and it would have been well, indeed, for some of us if they had gone no further than committing such outrages. Whole companies dispersed to a man to seek and carry off a wounded German as prisoner, or to strip and take away the saddlery from a dead horse. I myself was saved from this kind of treatment by the kind intervention of a French officer, who took me under his protection. But whilst he was giving me a drink from his flask his own men tapped him on the shoulder and showed in unmistakable terms that they highly disapproved of his conduct."

The author goes on to say that he thinks he has shown that the German cavalry charged on this occasion a disorderly mob; hence, indeed, its success. But he warns his countrymen that they must not expect this sort of thing to happen very often again. Had the French infantry, he says, possessed any kind of military tactical training, discipline, or cohesion, the German cavalry would have ceased to exist in about 10 minutes.

The German cavalry, he points out, after charging the French, somewhere near where the right flank of the 3rd Company 57th was extended, wheeled to the left, rode down the French lines of skirmishers, etc., and leaving Mars-la-Tour on the left, disappeared from the battle-field. But the French advanced, he says, once more and opened what he calls an "idiotic" fire on nothing in particular. This advance, he points out, was made without any kind of military order, and was merely for the sake of resuming the occupation of plundering the killed and wounded. It has been maintained that the French at once retired after the charge of the German dragoons, but Hoenig says this was not the case, for they took more than one dismounted prisoner of the dragoons after the charge. The real cause of the French retreat, he adds, was the appearance of Rheinbaben's Cavalry Division at Ville sur Yron.





SCALE: 50,000

Extreme Bounda

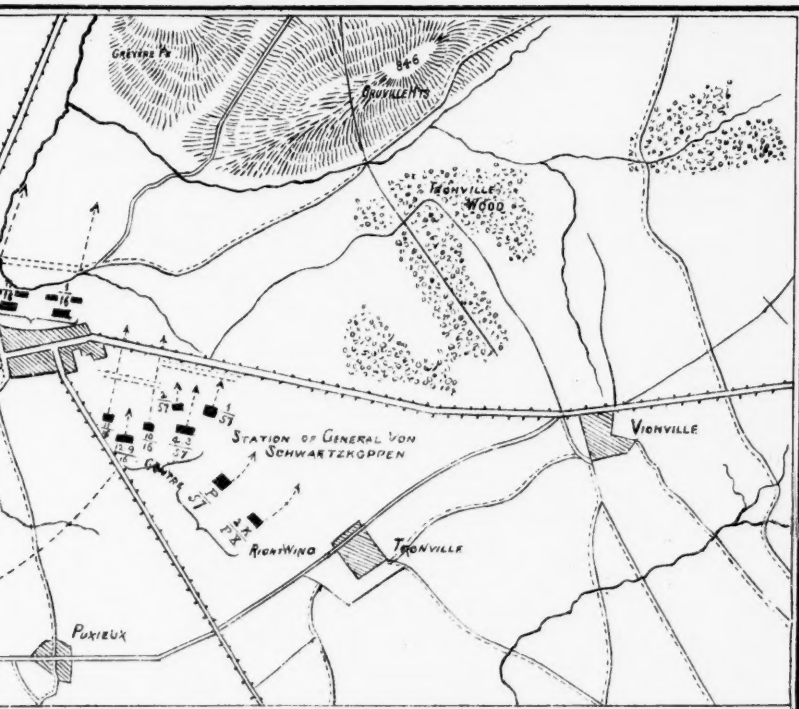


J. J. KELMER & CO. Litho. London

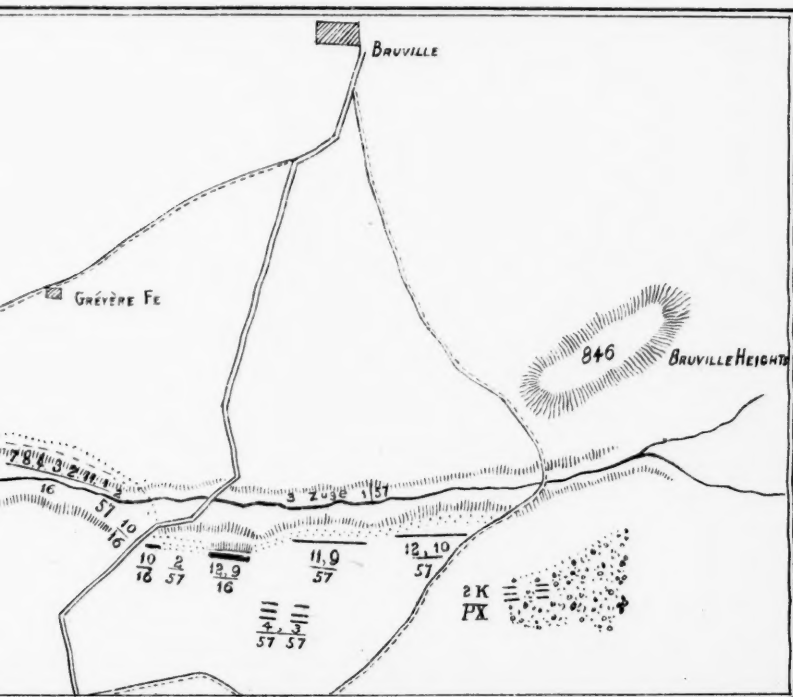
# THE 38th BRIGADE

moment of its defiling past General Von Schwartzkoppen,  
between 4.15 and 4.30 p.m.

Plate 8



Boundary of the Attack of the 38th Infantry Brigade,  
between 5 and 5.15 p.m.







## ON ELECTRIC VENTILATORS.

*By Doctor L. PASQUALINI.*

Translated from the "Rivista Marittima" for December, 1893,  
by Staff Engineer T. J. HADDY, R.N.

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I.

THE electric motors employed to give motion to ventilators represent the most important and prolific applications of this power to be found in the field of electricity. Ventilators not entirely closed, whether they are of the centrifugal or helicoidal type, require for efficiency a high tangential velocity, and this cannot be obtained except by employing fans of large diameter, or a high speed of revolution. In the first case, it is possible to use steam motors coupled directly, but the apparatus becomes heavy, costly, and difficult to keep in order; in the second case, since steam motors of high speed are of small efficiency and cannot withstand prolonged and constant running, coupling direct is inconvenient, and recourse must be had of necessity to belting, which is to be avoided as much as possible on board ship. The electric motor, on the contrary, which finds its best working condition in the high speed of rotation required for the ventilator, can be always coupled direct, can be constructed for very small powers without loss of efficiency, can be coupled to ventilators of very small capacity, and is hence independent. Motors can be economically employed for the ventilation of the various branches; thus avoiding large and cumbersome ventilating trunks, and sometimes dangerous communications between one compartment and another.

It is also a disadvantage not to be disregarded in steam ventilators as compared with electric, that they very often require steam pipes to be introduced especially for them, thus providing a source of heat to the spaces which it is desired to keep cool. It is due, doubtless, to these incontestable advantages that electric ventilators are superseding those worked by steam wherever the necessary distribution of electric energy exists, and are being fitted on board ships where the ventilation

is of capital importance. The study which we now desire to undertake aims at its practical application, and for that reason we shall only touch lightly on the theory of ventilators; but study them and their effects so as to deduce data for the comparison of two different types, and rules for the most convenient and efficient application of them.

Amongst the different forms of ventilators the most in use are the "centrifugal" and the "helicoidal," often also called "aerators" and "compressors"; although this distinction is justified from a certain point of view, it is preferable to call both ventilators, qualifying them as "centrifugal" and "helicoidal," which well describes their construction and mode of action.

The helicoidal ventilator is nothing more than a true helix or screw propeller, of eight or ten blades, which, when set in motion, drives the air in front of it in the direction of the axis of rotation. It is frequently fitted in the diaphragm of a bulkhead or partition, serving to establish a current of air between one space and the other, and sometimes at the end of a ventilating trunk for drawing the air from the compartment it is desired to ventilate, and discharge it outside; or, on the contrary, to draw air from outside, and discharge it into the compartment to be ventilated. Before entering into the study of ventilators, it is necessary to have some idea of the transmission of air. Let us consider a straight conductor  $AB$  of uniform section traversed by a constant current of air or gas directly from  $A$  to  $B$ ; experiments prove that at the two points  $A$  and  $B$  there is established a difference of pressure proportional to the second power of the velocity, so that if  $V$  represents the velocity and  $\Delta h$  the difference of pressure, we may state that (a)  $\Delta h = \mu r^2$  where  $\mu$  is a co-efficient dependent on the length of the conductor  $AB$ , or its sectional figure, on the material of which it is constructed, and on the density of the air or gas. It is to be noted that by pressure at a point in the conductor, we mean the pressure indicated by the gauge when its orifice is presented to the current, or what we may call the dynamic pressure.

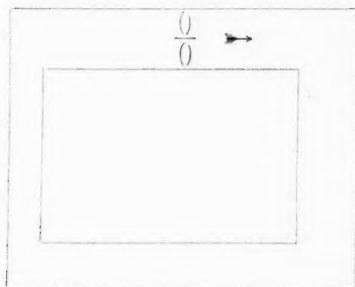
If we indicate the quantity of air supplied by  $Q$  in a unit of time, and the area of the section of the conductor by  $s$ , then  $Q = vs$  or (a) may be stated as—

$$\Delta h = \frac{\mu}{s^2} Q^2 = r Q^2 \quad (b)$$

the co-efficient  $r$  we shall call the resistance of the length  $AB$ .

Let us now consider a conductor closed on itself with sections of different areas in the separate branches, as shown in the figure, but the temperatures the same throughout. An apparatus placed at any point whatever in the circuit maintains the air in motion at a constant velocity. Imagining the conductor divided into sections infinitely small, we may suppose the area of each of these sections the same, and, therefore, applying (b) we may write  $dh = Q^2 dr$ . Integrating for the whole circuit, and considering that the supply must be necessarily the same at every point of it,  $H = \int dh = Q^2 \int dr$ , where  $H$  is the maximum difference

of pressure inside the tube. As long as the conductor remains the same,  $\int dr$  is a constant quantity, and will be the total resistance of the conductor. The maximum difference of pressure, which is that which can be given by the ventilating apparatus, and to which the motion of the air is due, we shall call the aeromotive power, and may enunciate the



theorem: "That when a constant current of air is maintained in a conductor by means of a ventilating apparatus, the square of the supply is equal to the aeromotive power of the ventilator divided by the resistance of the conductor." The ventilating apparatus itself generally offers a certain resistance to the passage of the air, and which we shall indicate by  $R_0$  as the internal resistance of the ventilator; so that if  $R$  is the resistance of the remaining circuit exclusive of the ventilator, the above equation will be expressed by—

$$Q^2 = \frac{H}{R + R_0} \quad (1)$$

and if  $h$  is the difference of pressure between the inlet and discharge orifices,  $H - h$  will be the loss of charge due to the resistance of the ventilator, and, therefore, we should have—

$$\frac{H - h}{R_0} = Q^2 \quad (2)$$

In the preceding, we have supposed that the specific volume of the air does not vary as the result of variation of pressure from one point to the other, and this supposition is allowable in the case of ventilators, since the maximum difference in pressure is always a very small fraction only of the atmospheric pressure.

What we have said as regards a conductor closed on itself, we may also extend to a conductor with both intake and discharge open to the atmosphere, as happens in ordinary cases of ventilation. If in a closed conductor any lengths should have a sectional area infinitely large, in the expression  $H = Q^2 \int dr$  the terms under the integral corresponding to those lengths become zero, but the integral preserves a finite value and does not change its signification. In those lengths the velocity will

be zero, and the difference of pressure necessary to impress motion on the air infinitely small. A ventilating shaft or conductor with both ends open to the atmosphere may well be treated as the preceding case, the atmosphere forming a part of the conductor infinitely great; a case analogous to that in telegraphy, with one circuit and an earth return. We must take account, however, of the fact that the intake and discharge orifices, if they have the contracted vein, offer a certain resistance which must be considered.

To supply a given volume of gas from one space at a given pressure to another space at a higher pressure, as we know, the necessary work is equal to the product of the volume into the difference of pressure; from which the work which is expended in overcoming the resistance of the conductor to the passage of the quantity of air  $Q$ , from the section  $A$  to the section  $B$ , is  $Q \Delta h$ ,  $\Delta h$  being the loss of the charge from one section to the other. If  $Q$  represents the quantity of air which passes from section  $A$  to section  $B$  in a unit of time,  $Q \Delta h$  is the power or work which must be expended in a unit of time; and if we consider the work expended through the whole of the conductor, it will be  $Q \int dh = QH$ ,  $H$  being what we have called the aeromotive force; and since  $H = Q^2 (R + R_0)$ , the power necessary to maintain this current of air may also be expressed by  $Q^3 (R + R_0)$ . In the application of the formulæ above we may choose the unit of measurement most suitable for following out the question. The practice now in use is to express the differences of pressures in millimetres of a column of water, the volume in cubic metres, and the supply in cubic metres per second. The pressure of a millimetre of water is equal to a kilogramme per square metre, so that the product of the volume into the pressure in millimetres of water gives the work directly in kilogrammetres. The product of the supply  $Q$  into the difference of pressure for a certain length of conductor gives the power in kilogrammetres expended to overcome the resistance in that length of conductor. The product of the supply into the aeromotive force gives the power expended through the whole of the conductor in order to maintain the current of air. As, however, we wish to study ventilators in their relation to electric motors, it will be more convenient to express the power always in watts, by multiplying the number of kilogrammetres by 9·81. Having determined our other units, the unit of resistance will be that of a conductor at the extremities of which the difference in pressure is 1 millimetre when the supply is 1 cubic metre per second.

From what we have said, it follows that for any ventilator it is necessary to know the aeromotive force (A.M.F.) which it can establish, and the internal resistance. The A.M.F. may frequently be deduced from the geometrical dimensions; it is always more simple and exact, however, to determine it experimentally. In order to do this it is only necessary to put the outlet in communication with an hermetically-closed box, and by means of pressure gauges properly arranged to determine the

difference of pressure created by the ventilator inside the box, and that of the external air. Evidently the A.M.F. is a function of the velocity, so that it is necessary in a given ventilator to determine the pressures for different velocities and obtain the law of variation from the results, or to represent one quantity as a function of the other by means of a diagram. The determination of the internal resistance requires a determination of the supply  $Q$ , and the corresponding difference of pressure  $h$ , between the inlet and outlet orifices. If at the same time the velocity is observed, from the preceding experiment we may deduce

the value  $H$  of the A.M.F., and then  $\frac{H-h}{Q^2} = R_0$  will give the internal

resistance. If the ventilator is working with the inlet freely open to the atmosphere,  $h$  is the excess of pressure above the atmosphere at the inlet orifice; the two data A.M.F. and internal resistance are sufficient to calculate the quantity of air which a given ventilator can furnish through a given conductor; for its application, however, it is necessary to know in addition the work necessary to maintain the ventilator in action. The necessary power to overcome the resistance which the air or gas encounters in the conductor is expressed, as we have said, by  $QH = Q^3(R + R_0)$ .

We may consider the work expended in overcoming the friction of the bearings of the fan as a function of the velocity; ordinarily it is admitted to be proportional to the square of the speed of rotation, but in reality it is very variable, depending on an infinity of small circumstances, such as the temperature, quantity and quality of the lubricant employed, etc. The best method is to determine the work expended by practical experiment at various speeds, and draw up a curve of the results, having the speeds for abscissæ and the powers expended for the ordinates of the curve. We shall indicate this power in general by  $L_n$ , expressed in watts.

To these two expenditures of power must be added a part due to the statical pressure, and which in some types of ventilators may be greater than that necessary to impress motion to the air. It depends on the form and geometrical dimensions, altogether passive, and which cannot be neglected when we wish to compare two different ventilators. When the ventilating fan forces the air into a closed space a resisting force is exerted on the fan due to the increased statical pressure produced in this space, and this resistance we may admit to be proportional to the augmented pressure, or to the A.M.F.  $H$  generated by the ventilator; the work, therefore, that must be expended on the axis at every second to maintain the ventilator in motion will be given by  $L_p = A_0 NH$ . In the case in which the ventilator does not discharge into a closed space, the pressure we have been considering, or the dynamic pressure, is composed of the "live pressure" (*pressione viva*), which is no other than the "live force" (*forza viva*) possessed by a unit of volume of air, and is, therefore, expressed in millimetres of water by  $1,000 \frac{v^2}{2g} \hat{e}$ ;  $\hat{e}$  being

the density of air relative to water, and of the statical pressure  $h_0$ , which would be that given by a gauge, the orifice of which is in a plane parallel to the current of air. We have the relation between the three pressures  $h_0 = h - 1,000 \frac{v_0^2}{2g} \hat{c}$ . Now, in the vicinity of the blades of the fan, the dynamic pressure is the A.M.F.  $H$ , and if we indicate the velocity of the air by  $v_0$ , the statical pressure is  $H - 1,000 \frac{v_0^2}{2g} \hat{c}$ ; and since the supply is proportional to the velocity  $v_0$  we may write  $H - BQ^2 \hat{c}$ . The statical pressure is that which exerts a re-action on the ventilator, and produces a resisting moment, for which the passive work will be—

$$L_p = AN(H - BQ^2 \hat{c}) \quad (3)$$

an expression which agrees with (a) when  $Q=0$ , or the ventilator works with a closed outlet. So that the total power which must be expended on the axis of the ventilator is given by—

$$P \text{ watts} = 9.81QH + AN(H - BQ^2 \hat{c}) + L_r \quad (4)$$

$A$  and  $B$  being variable co-efficients to be determined experimentally for each ventilator. From (4) with respect to  $Q$  we have  $\frac{dP}{dQ} = 9.81H - 2ANB\hat{c}Q$ , and for values of  $Q$  superior to  $Q = \frac{9.81H}{2ANB\hat{c}}$  the result becomes negative, or the work on the axis increases with the reduction of the supply, or with the augmented resistance of the conductor or air trunk. In centrifugal ventilators in which the product  $AB$  is generally small, the supply corresponding with the inversion of sign is very large; but, on the contrary, in the helicoidal type, for which  $AB$  is very large, the inversion of sign gives a very small supply, or the work on the axis is a maximum with a throttled outlet, and a minimum with a free one.

We may now pass on to the application of what we have said, verifying it experimentally, and for the present limiting ourselves to the study of a centrifugal ventilator. The one which served for the experiments was of the type by C. and C., of New York, No. 4 on the catalogue of that firm. It was constructed by the Edison Company, of Milan, and classed for a supply of 50 cubic metres per minute. The principal dimensions are:—

Maximum diameter, outer edge of blades	..	..	..	..	50 metre
Minimum " inner " "	..	..	..	..	25 "
Area of inlet orifice	..	..	..	..	0.50 sq. metre
" outlet " " "	..	..	..	..	0.96 " "

We will commence by the determination of the A.M.F. The ventilator worked with the inlet free and the outlet in communication with a closed box; the temperature was 24° C. Some water gauges fixed to the sides of the box registered the pressure, and a tachometer applied to the shaft of the fan gave the number of revolutions; it was driven by an electric motor. To vary the speed, resistances were inserted in the circuit of the motor, the circuit being derived from a conductor at constant potential.



## I.—A.M.F. CORRESPONDING TO VARIOUS VELOCITIES.

$$t=24^{\circ}\text{C.}, \delta = \cdot 00119$$

$N$ Revolutions per second.	$H$ Pressure in $\frac{\text{m}}{\text{m}}$ of Water.	$\frac{H}{N^2}$	$\frac{H}{N^2 \delta} = K$
6.66	7.7	.175	147.0
8.33	12.1	.174	146.1
10.00	17.5	.175	147.0
11.67	23.5	.173	145.2
13.33	31.2	.175	147.0
15.00	39.5	.175	147.0
16.67	48.5	.175	147.0
18.33	59.0	.175	147.0
20.00	70.0	.175	147.0

Mean of  $K=146.7$ .

The results obtained in the first and second columns of the table are also shown on the diagram *A* (Plate 10), and it will be seen that the curve is decidedly parabolic, from which we conclude that the pressure which the fan is able to produce is proportional to the square of the speed, and which is also better shown by the third column of the table, the relation of the pressure to speed squared being a constant quantity. As the pressure in millimetres of water corresponding to the velocity of a gas is proportional to the density of the gas, we are led to admit (although it would be very difficult to verify it by a direct experiment) that the A.M.F. developed by a ventilator is not only a function of the velocity, but is also dependent on the density, and proportional to it; we may, therefore, write  $H=KN^2\delta$ . Referring to the previous table, the temperature during the experiment being  $24^{\circ}\text{C.}$ , in order to get the constant  $K$  of the ventilator we divide by  $\delta = \cdot 00119$  the numbers in the third column, and so obtain the mean value of  $K=146.7$ . We may, therefore, conclude that in centrifugal ventilators the A.M.F. is proportional to the square of the velocity and to the density of the air or gas put in motion, and that in the case of the ventilator in the experiment  $H=146.7N^2\delta$ , where  $H$  will be expressed in millimetres of water,  $N$  the number of revolutions per second, and  $\delta$  the density relative to water.

We will now pass on to the determination of the internal resistance, which we have already said is given by the relation  $\frac{H-h}{Q^2}$ ,  $H$  being the A.M.F., and  $h$  the difference of dynamic pressure between the inlet and outlet orifices. The ventilator worked with the inlet freely open and the outlet communicating with a tube the same diameter as the outlet, and discharging into the same atmosphere that supplied the inlet. Four water gauges were fixed close to the outlet orifice, and the mean of their indications was taken as the value of  $h$ , and by this means the resistance of the discharge orifice to the efflux of the air was included in the resistance of the ventilator.

The supply was obtained by measuring with an anemometer the mean velocity of the air at the end of the tube, and multiplying this value by

the sectional area of the tube itself. Here we must observe that the resistance which we have defined is a function of, or rather proportional to, the density of the gas; so that with equal supply the resistance is the greater, the greater the density of the fluid. Hence, if we indicate the resistance of the ventilator by  $R_0$ , we may write  $R_0 = \rho_0 \bar{e}$ ; where  $\bar{e}$  it a quantity depending entirely on the geometric form. Here are the results obtained:—

## II.—INTERNAL RESISTANCE.

$$t = 24^\circ\text{C.}, \delta = .00119, \rho_0 = \frac{35.5}{.00119} = 29,832.$$

$N$ Revolutions per second.	$H = 146.7 N^2 \delta$ $\frac{\text{m}}{\text{m}}$ of Water.	$h$ $\frac{\text{m}}{\text{m}}$ of Water.	$Q$ Cubic Metres per second.	$R_0 = \frac{H-h}{Q^2}$
5.67	5.9	2.5	.318	33.5
6.67	7.7	2.7	.352	40.4
8.33	12.1	4.5	.432	35.3
10.00	17.5	7.1	.542	35.5
11.67	23.5	9.5	.624	35.8
13.33	31.2	12.6	.721	35.6
15.00	39.5	15.7	.803	36.8
16.67	48.5	19.5	.905	35.4
18.33	59.0	24.2	.997	35.0
20.00	70.0	30.6	1.120	31.4

Mean of  $R_0 = 35.5$ .

Allowing for the uncertainty which there must always be in determining the supply and the pressure, we see that  $\rho_0$  may be considered constant, and its value may be taken as 29,832, or, in round numbers, 30,000.

It remains to determine the co-efficients which enter into the expression  $L_p = AN(H - BQ^2\delta)$ , of the work lost by the re-action of the column of air against the blades of the fan. We may observe that if the ventilator is worked so as to compress the air in a closed space as  $Q=0$ , the expression becomes  $L_p = ANH = ANK\delta N^2$ ; and since  $K$  is known, it is enough to determine the work which must be expended on the shaft under these conditions to at once deduce the value of  $A$ . In our case, in which the ventilator is worked by an electric motor in series, the determination of  $L_p$  is simple enough, having recourse to the electric power absorbed by the motor. It is to be remembered, however, that from this work must be subtracted that lost by Joule's phenomena and in overcoming the friction of the bearings, neglecting that lost in the secondary phenomena, such as in the coils and the iron mass of the motor. The first is given by the square of the intensity of the current into the electrical resistance of the motor, the second requires a preliminary experiment by detaching the fan from its shaft. The work lost by friction is always very uncertain of determination for small motors, since very different values are obtained from very small disturbing influences; from a large number of trials we may assume, however, in the case of the ventilator with which we are dealing, that the mean values are the following, and which are those shown in the diagram *B*. (Plate 10.)

## III.—POWER LOST BY FRICTION OF BEARINGS.

<i>N</i> Revolutions per second.	Power lost in the Bearings. Watts.
5.00	20
6.66	27
8.33	37
10.00	47
11.66	58
13.33	70
15.00	82
16.66	94
18.33	107
20.00	120
21.66	136

In the following table, the electrical power required for various velocities is indicated in the second column, when the ventilator is working with a closed outlet; and in the fifth column the re-action due to the compressed air on the blades of the fan, which is obtained by subtracting from the total power required that due to Joule's phenomena and the friction of the bearings. In the sixth column are the values of the co-efficient *A*, as obtained from the various trials. For the small mass of the ventilator the power  $L_p$  is of the order of value  $L_r$ , and the uncertainty in the value of this power will influence the value of *A*. In any case, however, we can see clearly that it has a value constant for every velocity, and its mean value can be assumed with confidence to be .083.

IV.—CO-EFFICIENT, *A* MEAN VALUE .083.

<i>N</i> Revolutions per second.	<i>Ei</i> watts.	$i^2 r$ watts.	$L_r$	$L_p = Ei - i^2 r$ $- L_r$	$\frac{L_p}{HN} = A.$
6.66	48.4	19.4	27.0	2.0	.053
8.33	68.6	24.0	37.0	7.6	.090
10.00	88.4	24.2	47.0	17.2	.098
11.67	106.5	26.7	58.0	21.8	.078
13.33	130.1	29.6	70.0	30.5	.079
15.00	165.4	34.2	82.0	49.2	.088
16.66	201.7	38.3	94.0	69.4	.085

The value of *A* known, by making an experiment with outlet open we obtain the corresponding values of *N*, *Q*, *P*, which, when introduced into formula (3), enable us to obtain the value *B*. In the ventilators studied the whole of the term  $BQ^2\delta$  is very small; with a velocity of 1,000 revolutions per minute, and the maximum supply obtainable, it did not exceed 2 to 3 watts, which is less than the possible errors of the experimental determination. Without neglecting this quantity altogether however, we may say, as the result of a large number of experiments, that the most probable value of the co-efficient *B* is 3,210. So that in the

case of the ventilator C. and C., No. 4, the necessary power on the shaft would be

$$P \text{ watt} = 9.81 QH + .083 N (H - 3,210 Q^2 \delta) + L_r;$$

$L_r$  being given on table IV.

We cannot omit a reference to a completed verification of what we have hitherto stated. A tube of sheet zinc, 27 centimetres in diameter,  $1\frac{1}{2}$  metres long, with a butterfly valve at the middle of its length, for regulating the resistance to the motion of the air, was fitted to the outlet orifice of the ventilator, and in the vicinity of the outlet of the ventilator four water-pressure gauges were fitted, which gave the loss due to the resistance of the tube. As the small currents of air at the outlet cannot possibly have a direction of motion exactly parallel to the axis of the tube, the four gauges registered slightly different pressures, and the normal pressure was taken as the mean of the four indications. The supply was measured by taking the velocity of the air by an anemometer, the velocity of rotation by tachometer, and the electrical work expended was deduced from the indications of an ammeter inserted in the circuit of the motor, and from a voltmeter at the poles. In the following table are shown the results obtained from the experiments, and the values of the supply and of the power on the shaft as calculated from the foregoing formulæ. Taking account of the fact that the quantities measured by their nature do not admit of more than a relative approximation by the ordinary means of measurement, we see that the calculated values agree with those obtained by observation, and we are, therefore, authorised to state that what we have said with regard to centrifugal ventilators has been experimentally verified:—

$$V. - \delta = .00119.$$

$N$ (Revolutions per second)	10.00	11.67	13.33	15.00	16.67
$h$ ( $\frac{m}{m}$ of Water) ... ..	11.0	15.1	19.0	25.0	29.0
$Q$ observed $m^3$ per second	.404	.470	.558	.622	.695
$Q$ calculated $\sqrt{\frac{H-h}{R_0}}$ ... ..	.420	.491	.585	.637	.720
$H$ calculated ... ..	17.5	23.7	31.2	39.4	48.5
$9.81 QH$ in watts ... ..	69.5	109.2	170.5	241.0	337.0
$i^2 r$ in watts ... ..	49.5	63.5	81.2	99.0	125.0
$L_r$ in watts ... ..	47	58	70	82	94
$L_p = AN(H - BQ^2 \delta)$ in watts	14.0	22.8	23.2	47.6	94.7
$P$ calculated in watts... ..	180.0	253.5	351.9	469.6	650.7
$P = Ei$ observed in watts ...	185	262	351	472	655

To fix the ideas, let us suppose that a ventilator of the type which we are considering is worked at a speed of 1,300 revolutions per minute for supplying air through a conductor of resistance 32,300 $\delta$ , or a

conductor which required a difference of pressure  $32,300\delta$  millimetres of water to supply one cubic metre ( $1m^3$ ) of air of density  $\delta$  per second, the mean temperature of the air being at  $24^\circ\text{C}$ ., and its corresponding density  $\delta=001191$ . The constant of the A.M.F. being  $146\cdot7$ , the A.M.F. at 1,300 revolutions will be—

$$H = \left(\frac{1,300}{60}\right)^2 \times 146\cdot7 \times 001191 = 82\cdot5.$$

$30,000\delta$  being the resistance of the ventilator, the resistance of the whole circuit will be—

$$(30,000 + 32,300)\delta = 62,300\delta = 74\cdot5,$$

for which the supply will be—

$$Q = \sqrt{\frac{82\cdot5}{74\cdot5}} = 1\cdot050m^3 \text{ per second.}$$

For the power expended on the shaft we shall have—

$$P = 9\cdot81 \times 1\cdot05 \times 82\cdot5 + 0\cdot83 \times 21\cdot67 (82\cdot5 - 3210 \times 1\cdot05^2 \times 001191 + 136 = 850 + 140 + 136 = 1,126 \text{ watts.}$$

The difference of pressure  $h$  between the inlet and outlet ends of the ventilator is the part of the A.M.F. which is employed in overcoming the resistance of the external conductor, and  $hQ$  represents the work expended in overcoming this resistance.

Expressing the functions of  $H$  and  $R$  we have—

$$hQ = \sqrt{H^3}, \quad \sqrt{\frac{R^2}{(R+R_0)^3}}, \quad \text{and since } H = K\delta N^2$$

$$hQ = N^3 \sqrt{K^3\delta^3} \sqrt{\frac{R^2}{(R+R_0)^3}} \quad (c)$$

We see by this that the useful effect of a centrifugal ventilator with a given conductor is proportional to the third power of its speed of rotation, and hence the necessity of imparting a high velocity to this type of ventilator, and which can be most usefully effected by means of the electric motor.

For ventilation practically, the largest possible supply of air is the point of most importance, and, therefore, the sectional area of the air trunk or conductor is made as large as possible so as to make the resistance a minimum. Many circumstances, however, may prevent the employment of large conductors, and it is, therefore, interesting to know what is the maximum useful effect obtainable from a ventilator, or the maximum quantity of air it can put in motion compatible with a minimum section of conductor. By resolving (c) with respect to  $R$  and equating to zero, we obtain the condition of maximum useful effect  $R = 2R_0$ ; or the resistance of the conductor is double the internal resistance of the ventilator. Applying this to the case of a ventilator  $B$  employed to transport air to a certain distance through conductors of the minimum dimensions compatible with the maximum supply, the resistance of the whole system of the conductors must be  $2 \times 30,000\delta = 60,000\delta$ ;  $\delta$  being the density of the air at the ventilator. The relation between the useful

effect, the power expended on the shaft, and the supply  $\eta$  of the ventilator, is—

$$\eta = \frac{hQ}{HQ + AN(H - BQ^2\delta) + L_r}$$

## II.

Let us now consider the ventilator in relation to the motor, and, so as not to exceed the limits of our study, simply to examine into the behaviour of the motor under the varying resistance of the conductor or air trunk. The problem which we may propose to ourselves is the following:—Given a type of electric motor, the source of the electricity, the type of ventilator, and the resistance of the air trunk, to determine the velocity that the whole will assume, the air supply obtained, and the work absorbed. Let us assume also that the fan and motor are mounted on the same shaft, so that the frictional resistance of which we have taken account in speaking of the ventilator is the only one that comes into play. The power in watts on the shaft at any instant must be equal to that required by the ventilator, and is given by the expression—

$$P = 9.81QH + AN(H - BQ^2\delta) + L_r.$$

The effective power developed by the motor, neglecting the loss due to the Foucault currents and to the phenomena of self-induction, may be admitted to be equal to the power transformable, and which we know is given by  $\epsilon i$ ,  $\epsilon$  being the electromotive resistance (counter-electromotive force) developed by the inductor in its movement, and  $i$  the intensity of the current circulating in the inductor. The counter-E.M.F.  $\epsilon$  is expressed as we know by  $N\phi$ ;  $N$  being the number of revolutions made by the inductor, and  $\phi$  the maximum flow through its conductor. In series motors, which at present occupy our attention,  $\phi$  is a function of  $i$  and  $i$  only, for which at equal intensity the counter-E.M.F. is proportional to the number of revolutions. It follows that it is sufficient to determine the counter-E.M.F. at a given velocity corresponding to various intensities of current, in order to obtain this value for any intensity, and for any velocity. The counter-E.M.F. at a given velocity can be found experimentally by subtracting from the difference of potential at the poles the loss of potential due to the internal resistance. With the motor of the ventilator examined by us at a speed of 16.66 revolutions per second and varying the external work, we obtained the difference of potential shown in the first column, and the intensity of current shown in the second column of the following table:—

## VI.

$E$ volts.	$i$ ampères.	$i r$ volts.	$E - ir = \epsilon$ volts.
29.5	6.30	6.3	23.2
44.0	9.80	9.8	34.2
46.8	10.30	10.3	36.5
50.0	11.25	11.2	38.8
51.7	11.60	11.6	40.1
56.0	12.35	12.4	43.6

The internal resistance of the motor being about 1 ohm, the values of the third column give the loss of potential due to the internal resistance, and therefore the numbers in the last column give the counter-E.M.F. Taking the intensity as abscissa, and the counter-E.M.F. as ordinate, we may fix the characteristic of the motor at a velocity of 16.66 revolutions per second, or 1,000 per minute; then, varying the ordinates in agreement with the velocity, we shall be able to trace the characteristic at different velocities. (Table V., diagram C.) We have in this way characterised the motor sufficiently for the purpose of solving the problem with which we are concerned.

Let us suppose, for simplicity, that the temperature is  $24^{\circ}$ , which is not very different from what would be met with in practice, then,  $\epsilon$  being .001191, we shall have—

$$H = .175N^2$$

$$R_0 = 35.5$$

$$P = QH + .083.N(H - 3.82Q^2).$$

In this expression of the power we will commence to give to  $Q$  a constant value—for example,  $.4m^3$ —and calculate the power corresponding to different velocities. We shall have then—

## VII.

$N$ Revolutions per second.	$P$ watts.
10.00	128.5
13.33	226.3
16.66	350.4
20.00	509.0
23.33	706.4

Now, on the curve of the diagram C of the table corresponding to the velocity 10.00, let us find a point such that the product of the number of ampères corresponding to that of watts gives 128.5 watts; we shall have the point  $a_1$ . A curve of equal power in hundreds of watts traced and pricked off on the diagram would be useful in this operation. Repeating the process for the other velocities, we shall obtain the series of points  $a_1 a_2$ , which, when joined, will give the curve of equal supply  $Q = .4$ , from which we may obtain the intensity of the current and the counter-E.M.F. necessary to obtain this supply at the different velocities. In the same way we may trace the curve corresponding to other supplies, which was done in the diagram for the values of  $Q = 0, .2, .4, .6, .8$ , and 1.0, but at every velocity there is a corresponding maximum value for the supply. Let us suppose that the ventilator works with both inlet and outlet free to the atmosphere; generally we shall have the Vena Contracta, and there will be a loss of charge at the inlet—in other words, a certain resistance will be opposed to the flow of air, a resistance, however, which we have, for the sake of simplicity, included in that of the ventilator. It was permissible for us to do this, as, from the construction of the



apparatus, it must be admitted that the air is never led into the inlet by a suitable mouth-piece, but reaches it either directly from the atmosphere or from a locality large enough to keep this resistance constant. There is necessarily a difference of pressure between the outlet and the atmosphere, so that the air may be discharged with a certain velocity into the still air surrounding it; and since the outlet is free, and therefore the statical pressure there sensibly equal to that of the atmosphere, the difference of pressure will be given by the live pressure, which, as we have said, is equal to the *forza viva* of a unit of volume, or is expressed

in millimetres of water by  $h = 1,000 \frac{v^2}{2g} \hat{c}$ ; from which, when  $S$  is the sectional area of the outlet  $h = 1,000 \frac{v^2}{2g} \frac{s^2}{s^2} \hat{c} = 1,000 \frac{Q^2}{2g} \frac{\hat{c}}{s^2}$ ; in other words,

the resistance offered to the discharge of the air is  $R = \frac{h}{Q^2} = 1,000 \frac{\hat{c}}{2g s^2}$ ; and in our case, supposing  $t = 24^\circ$ , and therefore  $\hat{c} = .001191$  and  $s = .05$ ,  $R = 24.3$ , and the total resistance at the same temperature is—

$$R_0 + R = 35.5 + 24.3 = 59.8.$$

If the ventilator is working at a speed of  $N$  revolutions per second, its A.M.F. will be  $146.7 N^2 \delta$ , and therefore its maximum supply  $\frac{146.7 N^2 \delta}{59.8}$ .

With  $\delta = .001191$  and different values for  $N$  we obtain—

## VIII.

$N$ Revolutions per second.	Maximum Supply. $m^3 = \text{Cubic Metres.}$
10.00	.54
13.33	.72
16.66	.90
20.00	1.08
23.33	1.26

On the curve of constant velocity  $N = 10.00$ , using the curves of constant supply, let us mark the point corresponding to the supply .54. In the same manner on the curve  $N = 13.33$  mark the point corresponding to  $Q = .72$ , and so on for the other velocities. Joining the points so obtained, we shall get the curve shown in large dots and dashes, which is the curve of maximum supply for the ventilator.

This line and that of equal supply  $Q = 0$  divide the field into two parts, of which that comprised between the two curves is the geometrical locus of all the points which represent the possible conditions of the whole ventilator and electric motor. For instance, by way of example, it will never be possible that the motor should absorb less than a current of about 6.5 amperes, or more than about 13.5 amperes if the velocity is maintained at 16.66 revolutions per second. The curve of maximum supply was constructed by determining the supply at different velocities, the resistance remaining constant and equal to that of the ventilator, plus

that of the outlet orifice. This curve is, therefore, a curve of equal-constant resistance. In the same way, we may trace the curve corresponding to various resistances, and we should have a system of lines of which the extreme would coincide with that of  $Q=0$ . The diagram so completed will serve for any problems; in order not to lose in clearness, however, it is more convenient to construct only the curves of supply and velocity, and the given curve of resistance most suitable for the application. We shall trace only that corresponding to the maximum useful effect, which, as has been given, is the condition in which the resistance of the conductor is double that of the ventilator. In our case, always supposing  $\delta=.001191$ , the whole resistance must be  $R+R_0=3R_0=106.5$ , and therefore the supply at various velocities will be given by the relation  $\frac{146.7 \times .001191 N_2}{106.5} = Q_2$ , which gives—

## IX.

$N$ Revolutions per second.	$Q$ $m^3$ per second.
10.00	.40
13.33	.54
16.66	.67
20.00	.81
23.33	.94

As in the curve of maximum supply, we must find on the curve of constant velocity the points which correspond to the supplies given in the table, and we shall obtain the curve marked on the diagram with long dashes. Let us suppose that the motor is supplied by an electric installation, and that  $E$  is the difference of potential at the terminals. The intensity of the current ( $i$ ) and the counter-E.M.F. ( $e$ ) may be assumed to be of different values according to the resisting couple produced by the ventilator and to its velocity. These values, however, must always satisfy the equation  $E=ir+e$ . If now we join the point on the axis of the E.M.F., which has  $E$  for ordinate, with the point on the axis of the intensity, which has  $\frac{E}{r}$  abscissa, it is evident that the straight line

thus obtained is the geometrical locus of all the points, the co-ordinates of which satisfy the given equation. From which it follows that the current through the motor may assume all the intensities represented by the abscissæ of the points on the given line, and the counter-E.M.F. all the values given by the corresponding ordinates, but no other values are possible. In the case with which we are occupied, the motor being constructed to work at 65 volts, we must take on the axis of the volts an ordinate equal to 65, and the resistance of the motor being 1, we must take on the axis of the intensity an abscissa also equal to 65, we shall thus obtain the line  $MN$  marked in dots and dashes on the diagram. As then all the possible conditions are given by the points comprised between the two curves  $Q=0$  and that of the maximum supply, so when

the motor is supplied by an electrical conductor of 65 volts, the points representing the conditions possible are limited to the part of the straight line  $MN$  comprised between these two curves. It results from this that, with open outlet, the supply will be about  $\cdot 95m^3$  per second, or  $57m^3$  per minute; the velocity will be about 18 revolutions per second, or 1,100 per minute, and the intensity of the current about 14 ampères. By restricting the outlet or augmenting the resistance of the conductor, or air trunk, the velocity will increase until it reaches 29 revolutions per second, or 1,740 per minute, with outlet perfectly closed, in which condition the circuit intensity will be about 9 ampères.

It will then be easy to solve any problem whatever which may present itself in practice. For example, we require to have a supply of  $\cdot 6m^3$  per second, and wish to know what resistance should be given to the conductor and what will be the energy expended; by an examination of the diagrams we find that with 65 volts at the motor terminals the supply  $\cdot 6m^3$  corresponds to a speed of 20.47 revolutions per second, and for this speed as we know the corresponding E.M.F. is  $H=146.7 \times 20.47^2 \times \delta$ , and if  $\delta=0.01191$   $H=105$ ; from which the resistance of the conductor will be given by the relation  $R+35.5=\frac{105}{.6^2}$ , whence  $R=256.5$ . If the resistance of the conductor is given and we wish to know the supply obtainable, it will be necessary to construct a small part of the curve of constant resistance, and determine the point of intersection with the straight line characteristic of the circuit. If the resistance of the conductors be 300 units, the whole resistance will be 335.5, with which at a velocity of 20 revolutions per second the supply will be—

$$\sqrt{\frac{146.7 \times 20^2 \times \delta}{335.5}} = .457$$

and at 23.3

$$\sqrt{\frac{146.7 \times (23.3)^2 \times \delta}{335.5}} = .517.$$

On the two curves of velocity let us mark the two points corresponding to the supplies found, and join these two points with a straight line  $CD$ , of which the point of intersection with  $MN$  gives the condition which the ventilator will assume; or we shall have a supply of about  $\cdot 5m^3$  per second, a velocity of about 21.33 revolutions per second, and the motor will require a current of about 12 ampères. The error committed by supposing the curve of equal resistance to be a straight line may be neglected. The condition then of maximum useful effect is given by the point of intersection with the curve corresponding to a total resistance triple of that of the ventilator, marked by long dashes in the diagram. We should have a speed of 17.8 revolutions per second, a supply of  $\cdot 81m^3$  per second, while the current in the motor would be about 13.4 ampères.

Many other questions may be answered when once the diagram has been constructed in the way we have suggested, and it is sufficient for us to have shown how a somewhat complete study of an electric ventilator may be carried out.

## III.

It will not be out of place now to call attention to some calculations on air conductors in harmony with the method we have assumed in considering the ventilators.

When a volume of air  $Q$  passes at every second through a tube, of which  $x$  is the perimeter and  $s$  the sectional area, the difference of pressure at two points in the tube separated by a distance  $l$  may be expressed in general by  $\Delta h = c \frac{lx}{s^3} Q^2 \hat{c}$ . The co-efficient  $c$  for small sections and small velocities is not constant, but varies with the velocity and with the section of the conductor, and also depends always on the nature of the conductor and the state of its surfaces. If the conductor is of circular section, and the velocity above 5 metres per second (which occurs in the majority of cases), according to Arson's experiments  $c$  remains sensibly constant for any velocity, and varies very nearly indeed inversely with the square root of the diameter. By Arson's experiments it would be for iron conductors  $K = \frac{.18}{\sqrt{D}}$ , understanding that the length is expressed in metres, the supply in  $m^3$  per second, and the pressure in millimetres of water.

When the conductors are not very long, and for tubes of diameters between .2 and .4 metre, we may assume as the constant value of  $K$ , .321, by which in calculating the loss of charge due to the friction of the inlet orifice the maximum error will not exceed 8 per cent. We shall have, therefore,  $\Delta h = .321 \frac{lx}{s^3} Q^2 \hat{c}$ , and as  $x = \pi D$ , and  $s = \frac{\pi D^2}{4}$  is  $\Delta h = \frac{.321 \times 64}{(3.14)^2} \frac{l}{D^5} Q^2 \hat{c}$ , and, therefore, the resistance offered by a straight tube of circular section is  $2.08 \frac{l}{D^5} \hat{c}$ . By our own experiments  $K$  was reduced to .14 for zinc tubes, a value agreeing sensibly with what Arson found it to be for tubes in tin; from this we may assume the value .14 to be correct for metallic tubes with smooth surfaces. It is not the friction along the tube alone which offers resistance to the movement of the air, but any increase in sectional area or change of direction occasions a loss of charge; also passage through a hole in a thin bulkhead separating two spaces very large in comparison with the hole offers a resistance,  $R = 120.6 \frac{\hat{c}}{s^2}$ ; but if the hole is provided with a length of cylindrical tube the resistance is reduced to  $R = 74.2 \frac{\hat{c}}{s^2}$ .

The passage from a large space to a tube offers a resistance  $R = \left( \frac{1}{\phi^2} - 1 \right) \frac{1000 \hat{c}}{2g s^2}$ , where  $\phi$  is the co-efficient of the Vena Contracta. If the tube is applied directly to the flat bulkhead  $\phi = .83$ , and therefore  $R = 23.0 \frac{\hat{c}}{s^2}$ . If the tube is fastened to the bulkhead with a conical part

having the angle of the vertex  $30^\circ$   $\phi=1$ , and then  $R=0$ . The passage from a tube to a space large enough for the air to lose its velocity almost completely is  $\frac{1000\hat{c}}{2g s^2} = \frac{51\hat{c}}{s^2}$ .

In a sharp change of direction, from Weisbach's experiments it would appear that the resistance is proportional to the square of the angle made by one branch with a prolongation of the other, and would be  $R=0.0525\hat{c}\frac{a^2}{s^2}$ ,  $a$  being expressed in degrees. As a consequence of this, an angle of  $90^\circ$  in a cylindrical conductor of 20 centimetres diameter would be equal to about a metre in length of tube. The resistance offered by sharp bends is felt more with tubes of small diameter; for instance, with a tube of 10 centimetres in diameter an angle of  $90^\circ$  would be equal to about 4 metres length of tube. The resistance of change of direction is greatly diminished if the two branches are united by easy curves; it is sufficient that the radius of curvature in a circular conductor should be four or five times the diameter of the tube, in order for the increased resistance from this cause to become inappreciable, and if the conductor is rectangular the radius of curvature should be four or five times the length of the side of the rectangle which lies in the plane of the curve.

The remainder of Doctor Pasqualini's article is taken up with calculations of the resistances of tubes of various forms, or with branches at various angles, and although these calculations are of much interest from a mathematical point of view, they are too abstruse to be of much interest to the general reader; besides which, it is quite impossible to provide theoretically for all the conditions which occur in practice. This question of electric motors for ventilators is of great interest, seeing the importance of ventilation on board ships, and the system would appear to be especially suitable in ships of modern design for ventilating the magazines, which are often exposed to somewhat high temperatures, injurious to most of the explosives now in use. It could also probably be employed with advantage for working portable ventilators for ventilating double bottoms, and other confined spaces for which permanent ventilating fittings are not provided; and, in fact, it is not at all improbable that electrically-driven ventilating fans will eventually be universally and exclusively employed for ventilating our ships-of-war.

## APPENDIX TO "ELECTRIC VENTILATORS."

"Rivista Marittima," May, 1894

In a former article I have shown how the work which must be expended on the shaft of a ventilator may be expressed by the equation—

$$P \text{ watts} = gQH + AN(H - B\delta Q^2) + L_r \quad (1)$$

where  $Q$  is the air supply per second in cubic metres,

$H$  the aeromotive force in millimetres of water,

$N$  the revolutions per second,

$\delta$  the density of the air,

$L$  work expended in overcoming the friction of the bearings,

$A$  and  $B$  two co-efficients depending on the form and dimensions of the ventilator.

The small size of the ventilator at my disposal did not furnish a reliable verification of the above expression, and it will not, therefore, be out of place to refer to its application in another experiment which I have been able to make with a ventilator of larger dimensions of the type C & C, constructed by the Edison Company, of Milan, and known in the Naval Service by the distinguishing letter **C**. The diameter of the fan was 750 metre, that of the discharge orifice 405 metre.

Proceeding as indicated in the above-quoted article, the resulting expression for the aeromotive force was  $H = 352\delta N^2$ , and for the internal resistance  $R_0 = 3,800\delta$ ; for the co-efficients  $A$  and  $B$  of equation (1) the values obtained were—

$$A = .38$$

$$B = 3070$$

As a mean of numerous trials the work lost by resistance of the bearings at various speeds was as follows—

$N$ Revolutions per second.	$L_r$ watts.
7.55	109
9.55	143
11.67	179
13.62	211
15.65	247

In the following table are given the results of three experiments carried out under different conditions, from which it appears that the given expression for the power is sufficiently verified.

C VENTILATOR (C & C, No. 7).  $t=17^{\circ}\text{C}$ .

$N$ Revolutions per second.	$H$ $\frac{\text{m}}{\text{m}}$ of Water.	$Q$ $\text{m}^3$ per minute.	$gQH$ watts.	$A(H-B \delta Q^2)N$ watts.	$L_r$	$P$ Calculated watts.	$P_1$ observed $=E_f - I^2 r$ watts.
<i>Discharge Fully Open.</i>							
7.55	24.2	1.68	395	39	109	543	577
9.55	38.7	2.13	810	79	143	1082	958
11.67	57.5	2.61	1470	143	179	1792	1778
13.62	78.5	3.04	2339	230	211	2780	2713
<i>Discharge Throttled.</i>							
7.55	24.2	1.65	249	56	109	414	419
9.55	38.7	1.34	509	116	143	768	768
11.67	57.5	1.63	919	211	179	1309	1343
13.62	78.5	1.90	1400	336	211	2007	2050
<i>Discharge Closed.</i>							
7.55	24.2	0	0	69	109	178	211
9.55	38.7	0	0	140	143	283	283
11.67	57.5	0	0	255	179	434	416
13.62	78.5	0	0	407	211	618	617

The values in the last column were deduced from the electrical energy required by the motor deducting that due to Joule's phenomena.





Diagram. a.

aero motive force —  $m/m$  of water.

80  
70  
60  
50  
40  
30  
20  
10  
0

5

10

15

20

Revs. per sec.

140

130

120

110

100

90

80

70

60

50

40

30

20

10

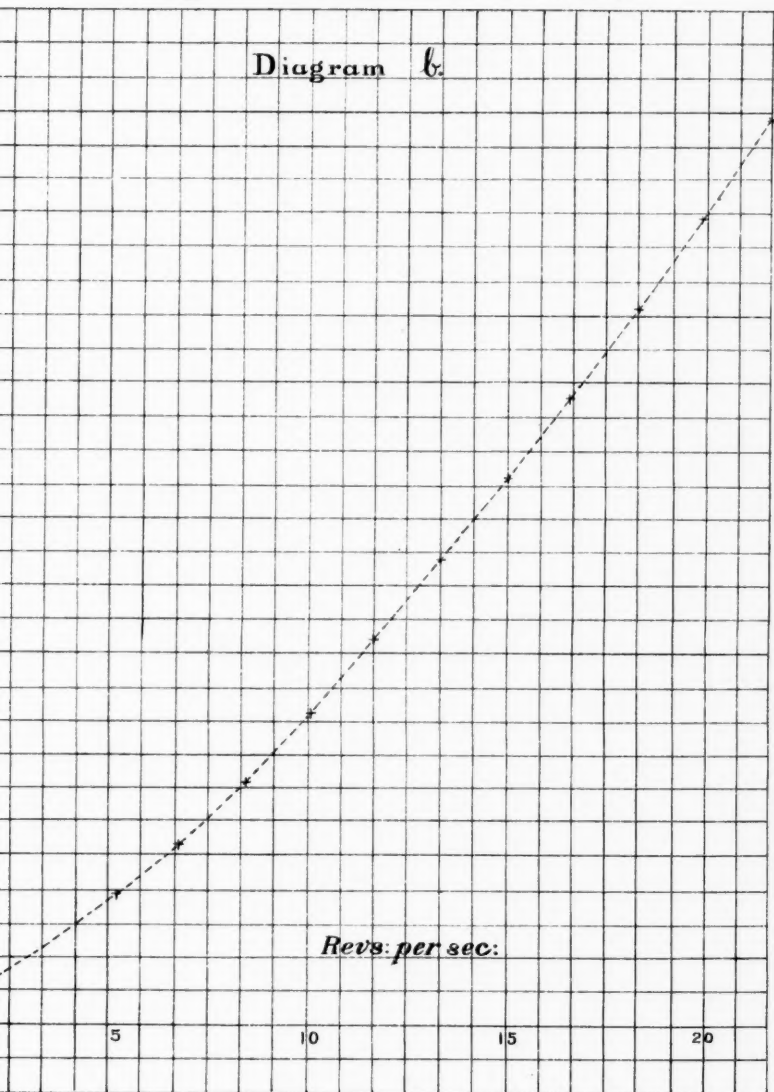
0

Power lost on the bearings .. Watts.

*Electric Ventilators* —

*Centrifugal Ventilator C&C N° 4.* —

Diagram 6.



Electric Ventilators —

— Centrifugal Ventilator C&C N<sup>o</sup> 4. —

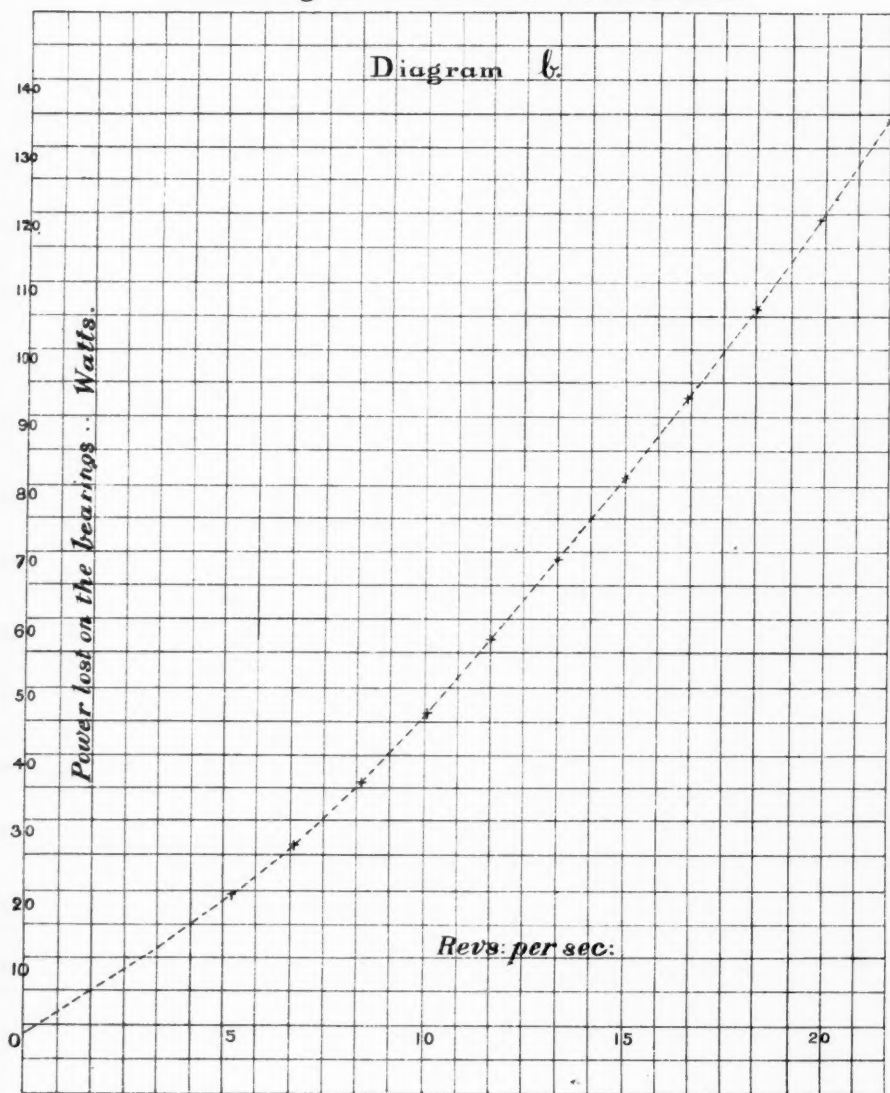
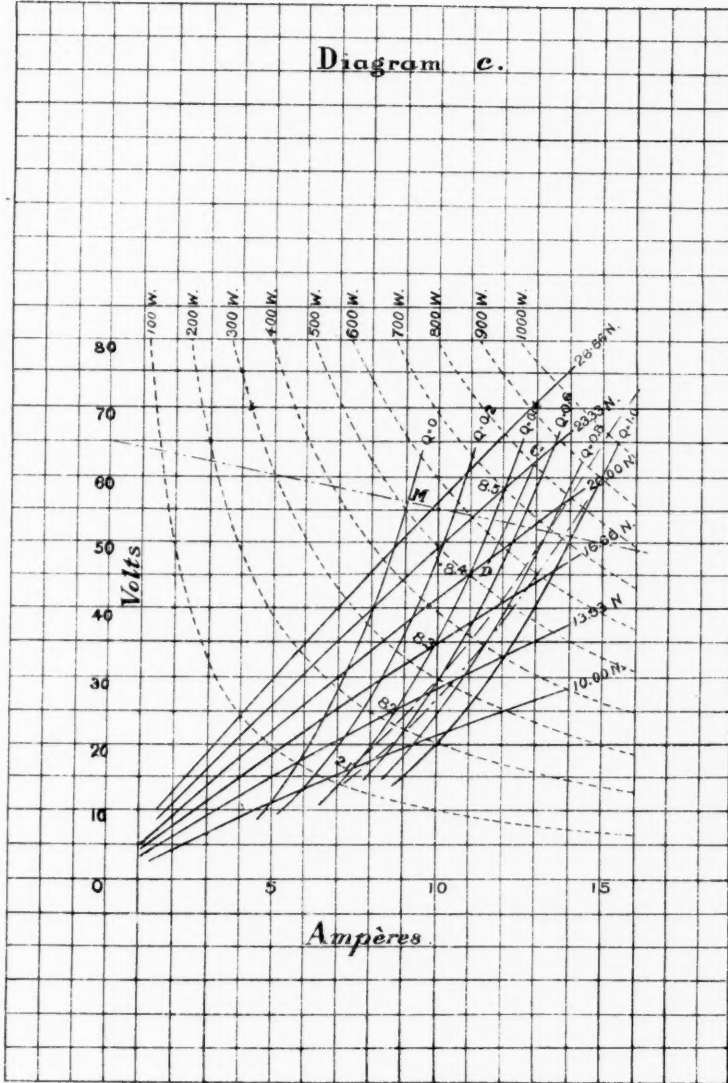


Diagram c.



In the following table are given data which may be useful in practice relating to the ventilator C & C, in use in the Navy.

In the following table are given data which may be useful in practice relating to the ventilator C & C, in use in the Navy.

Characteristic Letter.	No. in Catalogue.	Electrical resistance of Motor. Ohms.	$K$ ( $H = K \delta N^3$ )	$\rho_0$ ( $R_0 = \rho_0 \delta$ ).	$\frac{A}{(P = QHg + AN(H - B \delta Q^2) + L_r)}$	$\frac{B}{(L_r = \lambda N)}$
A	2	1.980	61	110000	—	—
B	4	.900	147	30000	.08	5.9
—	6	.303	257	10300	.21	17.4
C	7	.300	352	3800	.38	15.2

The resistance  $r$  was measured some hours after starting work.

The power  $L_r$  lost by friction in the bearings within the limits of velocity at which the ventilator is usually worked may be considered proportionate to the number of revolutions per second.

When the complete diagram is constructed for an electric ventilator as C (see preceding article), it is sufficient to know the intensity of the current absorbed by the motor, with a given difference of potential at the poles, in order to at once deduce the supply of air and number of revolutions, and thence to calculate the resistance of the air trunks.

But we can find this resistance with sufficient approximation for practice by the data in the table alone, provided that we also know the number of revolutions. Substituting in (1) the values of  $L_r Q$  and  $H$  given by

$$L_r = \lambda N$$

$$H = (R + R_0) Q^2$$

$$H = K \delta N^2$$

and observing that if  $E$  is the difference of potential at the poles of the motor, and  $i$  the intensity of current  $P = ei - i^2 r$ , we have an equation in which  $R$  is the only unknown quantity. Of the two quantities which are found the larger only is retained.





## NAVAL NOTES.

HOME.—The following are the principal appointments which have been made: Rear-Admirals—A. T. Powlett to be Second in Command of the Channel Squadron; C. L. Oxley to be Second in Command of the China Squadron. Captains—T. S. Jackson to "Inflexible"; R. F. Hammick to "Nelson"; A. B. Jenkins to "Algiers," for Steam Reserve at Chatham; A. W. Prothero to "Intrepid"; C. Johnstone to "Vivid," for Naval Barracks, Keyham; E. Rooke to "Benbow"; P. Aldrich to "Impregnable"; W. Des V. Hamilton to "Hawke." Commanders—P. Routh to "Cruiser"; Hon. A. E. Bethell to "Blanche"; G. A. MacArthur to "Medea."

Rear-Admiral Oxley hoists his flag on the first-class cruiser "Grafton," which relieves a sister-ship, the "Edgar," on the China Station. The "Edgar" is another instance of how much our new ships improve in their steaming powers by being kept in commission; although only built as a 19-knot ship, during a late run under natural draught from Nagasaki to Yokohama (a distance of over 700 miles), the ship averaged a mean speed of 18·5 knots, the average for one 12 hours being 19·6 knots, while 20·2 knots was recorded at one time. The "Nelson" takes out a new crew for the first-class battle-ship "Trafalgar," which ship recommissions at Malta. The new second-class cruiser "Fox" has left for the Cape station; the new second-class cruiser "Intrepid" has commissioned at Portsmouth for service on the North American station, where she will relieve the old composite third-class cruiser "Tourmaline." The third-class cruiser "Melpomene" is to relieve the "Daedalus" as Drill-ship for Naval Reserve at Bristol, and the third-class cruiser "Blanche" relieves the "Barham" in the Mediterranean.

The new first-class battle-ship "Renown" has successfully completed her trials. A gratifying feature of the four hours' run under forced draught was that the guaranteed I.H.P.—12,000—was exceeded by nearly 1,000, and this with only  $\frac{3}{8}$ ths of an inch air-pressure, thus showing the "Renown" to be an easy and an economical steamer. It is a noteworthy fact that her mean speed was exactly a knot above that provided for when she was designed. For the four hours' run the mean results were:—Steam, 145 lbs.; vacuum, starboard 27·5, port 27 inches; revolutions, starboard 101·6, port 106·5; I.H.P., starboard 6,340, port 6,561—total, 12,901; air pressure,  $\frac{3}{8}$ th of an inch; speed, 18·75 knots. The thirty hours' trial shows that her most economical rate of steaming is  $\frac{3}{8}$ ths of her full natural draught engine-power, at which she made a speed of over 15 knots, the vessel being ballasted to give her the same draught, 26 feet 9 inches, as she will have when in commission fully completed for sea service. The mean results of the trial were:—Steam, 137 lbs.; vacuum—starboard 27·8 inches, port 26·8 inches; revolutions—starboard 85, port 88·6; I.H.P.—starboard 3,143, port 3,044; total, 6,187; air-pressure, *nil*; speed, 15·3 knots. The coal consumption was 1·88 lb. of coal for each I.H.P. per hour; the coal stowage capacity at load draught is 800 tons. The gunnery trials of the ship were equally satisfactory. Three rounds were fired from each of the two 10-inch guns in the fore barbette, the bearings of these guns varying from 30° abaft the starboard beam to around the bow to 30° abaft the port beam. The after barbette worked under similar conditions, but from 30° before the starboard beam around the stern to 30° before the port beam. A novel

experiment, and for the ship's fittings a most severe test, was the firing of two guns in each barbette simultaneously. Notwithstanding the severe strain brought to bear in the immediate vicinity of the barbette by the discharge of two 500-lb. projectiles, examination failed to disclose any trace of the shock, and this in face of the fact that the guns were fired at an elevation of  $35^{\circ}$ . It must be understood that the severity of this test lies in the circumstance that the after barbette was trained right astern and the fore barbette right ahead. Two rounds were fired from each of the 6-inch Q.F. guns, four rounds from each of the 12 and 3-pounder Q.F. guns, and fifty rounds from each of the Maxim machine-guns.

The new torpedo-boat destroyer "Ranger," built by Messrs. Hawthorn, Leslie and Co., has also completed the three hours' trial of her engines on the measured mile off the Maplin Sands. The machinery worked smoothly throughout, and less vibration was experienced than in some of the boats of the same type. The mean speed for the full time was 27.172 knots. The official results were:—Draught of water, 5 feet forward, 8 feet 8½ inches aft; steam pressure in boilers, 194 lbs. per square inch; mean I.H.P., 2,025 starboard, 2,030 port—total 4,055, or 55 in excess of the contract; revolutions per minute, 350.7 starboard, 345.8 port. The "Hunter," a vessel of a similar type, built by the Fairfield Shipbuilding Company, has also completed the three hours' trial of her machinery at Portsmouth. Her draught was 5 feet 1 inch forward and 7 feet 5 inches aft. The steam in boilers was 195 lbs., with a total I.H.P. of 4,245. She gave a mean speed of 27.245 knots during six runs on the measured mile. The trial was regarded as highly satisfactory.

The "Desperate," the first of the 30-knot torpedo-boat destroyers built by Messrs. Thornycroft and Co., made at her preliminary trial a mean speed of 31 knots, or a knot over the guaranteed contract speed, the engines making 396 revolutions, and developing 5,700-I.H.P. On her official trials, which were made off the Nore in a high sea and wind, and lasted for three hours, the speed attained was 30 knots. The actual distance run in the time was 103½ miles, or slightly over 34½ miles an hour. The dimensions of the "Desperate" are as follows:—Length, 208 feet; beam, 19 feet 6 inches; and mean draught, 6 feet 4 inches.

The new first-class battle-ship "Mars" was floated out of dock at Birkenhead on the 30th ult., from the yard of Messrs. Laird Bros. She is of the "Majestic" type, designed by Sir William H. White, Director of Naval Construction. Her dimensions are as follows:—Length, 390 feet; breadth, 75 feet; mean draught, 27 feet 6 inches; displacement, 14,900 tons; freeboard forward, 25 feet; aft, 18 feet 6 inches; power of engines with forced draught, 12,000-I.H.P., with natural draught, 10,000; speed, natural draught, 16½ knots, forced draught, 17½ knots; coal carried at the designed load draught, 900 tons, with a reserve of 500 tons a side, making a total stowage for 1,900 tons, with which she will steam at 10 knots for about a month, or 8,000 knots. The reserve bunkers form additional protection with an armoured deck behind side armour. The barbette guns are 27 feet above the water-line. The citadel or side armour is 220 feet, with a vertical height of 15 feet of Harveyized steel 9 inches thick and barbettes 14 inches thick. The protective deck from lower edge of armour covering machinery, magazines, and other vital parts has 4 inches on slopes to 2½ inches on the flat and extends to the extreme ends. The vessel is lighted throughout with an installation of about 900 electric lights, and equipped with six search lights of 30,000-candle-power, each of which is capable of being worked by dynamos under protection. There are two conning towers, the forward tower armoured with 14 inches, and the after one with 3 inches, and to these towers are led all voice pipes and telegraphs to be used by the officers in charge of navigating the ship when in action. The armament of the "Mars" will comprise four 12-inch 46-ton breech-loading new type wire-coiled guns, mounted *en barbette* in pairs, and firing a projectile weighing 850 lbs., with a powder charge of 148 lbs. There are fifty Q.F. guns in

all—twelve 6-inch on the main and upper decks mounted in casemates protected by 6-inch armour, eighteen 12-pounder, twelve 3-pounder Q.F., eight small machine-guns, and five field guns. The auxiliary armament of the lighter guns is distributed all over the ship, a considerable number disposed upon the bridge and in the tops. The main armament is worked by hydraulic machinery, supplied by Sir W. G. Armstrong and Co. The other guns are all worked by hand. There are five torpedo-tubes, four are submerged and one discharges above water at the stern.

The port and starboard engines and boilers are separated by middle line longitudinal bulkheads, and can be worked independently. There are further longitudinal bulkheads, also watertight, at the sides, extending throughout the machinery space, forming coal bunkers and wing spaces. On the platform and lower decks is placed the auxiliary machinery, including steering engines in duplicate, electric engines (the electric wiring being done by Messrs. Laird), and hydraulic pumping engines, as well as a fully-equipped engineers' workshop and numerous store rooms. The main propelling machinery consists of two sets of engines of the triple-expansion inverted type of Messrs. Laird Brothers' design. The screw propellers are four bladed, the blades and bosses being of manganese bronze. The boilers are eight in number, single ended, of the cylindrical return-tube type. Each pair of boilers is in a separate water-tight compartment, with independent coal supply, separate access to and from main deck, etc. The exhaust steam from the whole of the auxiliary machinery in the ship is delivered to an exhaust pipe connecting with the two auxiliary condensers, one in either engine-room, each of these condensers having its own air and circulating pump worked by an independent engine. There are two distillers with circulating and distributing pumps, four Admiralty type main feed and four auxiliary feed pumps, of ample size to supply the whole of the boilers at full power, and four double-cylinder double-acting bilge and fire pumps, and a pump for pumping out the drain tank. The several pumps are connected to the large drain pipe and double bottom. General ventilation is secured by two large fans 72 inches in diameter, and eight fans 72 inches in diameter supply the forced draught for the boilers and engines.

The "Mars" illustrates the advantage of building these large battle-ships in dock in preference to building them on a slip and launching them, as she carries with her all her citadel armour, most of the barbette armour, and four casemate fronts—indeed, all the armour plating would have been completed had it not been for the press of work in Sheffield rendering it impossible for the armour-plate manufacturers to make delivery as early as required. The main boilers are on board, with all mountings and connections complete, ready for steam, save the funnels. The whole of the auxiliary machinery is also in place, and pipes and connections fitted, and the main engines are fully two-thirds erected on board, so that the vessel as floated out from the building dock is in a far more advanced state than would have been the case had she been launched in the ordinary way.

The order for the "Mars" was given exactly two years ago on March 26th, and the steel and other materials were obtained and her keel laid on June 2nd, 1894, practically twenty-two months to date. When ready for the pennant in six or eight months she will have a complement of 750 men.

The Admiralty have given out the contracts for four third-class cruisers of the "Pelorus" type. Two of them, to be called the "Perseus" and the "Prometheus," are to be constructed by Earle's Shipbuilding Company, Hull, and the others, to be called the "Pegasus" and the "Pyramus," by Palmer's Shipbuilding Company, Jarrow-on-Tyne. The dimensions of the vessels will be:—Length, 300 feet; breadth, 36 feet 6 inches; mean load draught, 13 feet 6 inches; displacement at load draught, 2,135 tons. Each vessel will be fitted with water-tube boilers and engines capable of developing an I.H.P. of 5,000 with natural draught, and 7,000 with forced draught. The contractors have to guarantee a mean speed of 18.5 knots for eight hours' steaming with natural draught, and of

20 knots for a four hours' trial with the forced draught. The armament will include eight 4-inch and eight 3-pounder Q.F. guns and two Whitehead torpedo-tubes. Although the details of the new vessels have not yet been completed, it is roughly estimated that they will cost £142,000 each, and the contractors have received authority to advance each vessel to the extent of £60,000 by the 31st March next.

The twenty torpedo-boat destroyers authorised to be built under the new naval programme have also been given out to contract by the Admiralty. When the specifications for these vessels were distributed among the various builders willing to tender, it was requested that offers be submitted for crafts to steam at 30 knots and also for vessels of higher speeds. It is understood that several firms were willing to guarantee a speed of 32 knots, and that Messrs. Hawthorne, Leslie and Company, Newcastle-on-Tyne, were prepared to submit designs for a vessel to steam 33·5 knots. After due consideration the Whitehall authorities decided that, with only two exceptions, the new boats should have a speed of 30 knots. In the case of the excepted vessels, however, the speed stipulated is 32 knots, and their construction has been entrusted one each to Thornycroft and Company, Chiswick, and J. and G. Thomson, Clydebank. Both these firms have had considerable experience with high-speed vessels of this description, and in the planning of the new "record breakers" the Admiralty have given them quite a free hand, and without exacting any penalties excepting as to speed. By experts the progress of these two vessels will be watched with keen interest, for the realisation of the guaranteed speed will help to solve many of the difficult yet fascinating problems incident to ship propulsion at high velocities. Messrs. J. and G. Thomson have elected to adopt the Normand tubulose boiler for their boat, while Messrs. Thornycroft and Company will use their own patent steam generator, which met with such success in the recent trials of the torpedo-destroyer "Desperate." Of the twenty new boats contracted for, five have been placed on the Clyde, eight with builders on the East Coast, and four on the Thames.

The third-class battle-ship "Monarch," has been passed into the A Division of the Reserve at Chatham. Upwards of £135,000 has been spent on refitting the vessel and furnishing her with a new set of engines and a new auxiliary armament of Q.F. guns. As a fighting machine the ship is of far more value than she was when first commissioned in 1869. Her recent trials were remarkably successful; although the contractors (Messrs. Maudslay, Sons and Field) only agreed to obtain 14·5 knots under forced draught, the average speed obtained was 15½ knots. At one period as much as 17¼ knots were got out of the vessel.—*The Times* and *The Naval and Military Record*.

AUSTRIA-HUNGARY.—On the 28th ult., the new coast-defence battle-ship "Buda-Pest" was launched from the Stabilimento Tecnico Triestino at San Rocco, near Trieste. The christening ceremony was performed by the Countess Marie Szechenyi-Andrassy, acting for Her Imperial Highness the Archduchess Marie Valerie, in presence of Admiral Freiherr von Sterneek, Commanding Admiral of the Navy, Vice-Admiral Freiherr von Spaun, Commanding at Pola, Rear-Admiral Freiherr von Minutello, Commanding the Trieste District, the Governor of the Province and other high officials, the officers of the garrison and of the Manceuvre Squadron, which had been ordered from Pola to Trieste to take part in the festivities.

The principal dimensions of the ship are as follows:—

Length ... ..	303 feet 6 inches.
Beam ... ..	55 feet 3 inches.
Displacement ... ..	5,550 tons.
Mean draught... ..	20 feet 6 inches.

The hull of the ship is constructed of Siemens-Martin steel, divided into the usual cellular and water-tight compartments, while the pumps will be sufficiently

powerful to discharge 1,500 tons of water hourly in case of necessity. Protection is afforded by an armour belt of 10·8-inch nickel steel, made by the Austrian firm of Witkowitz and Co., tapering to 8 inches aft, and 5 inches forward, which runs from the ram for five-sixths the length of the ship, extending from 3 feet 6 inches below to 3 feet 6 inches above the water-line at normal draught; the after ends being joined by an 8-inch armoured-athwart-ships bulkhead. On the top of the belt runs fore and aft the whole length of the ship a 1·8-inch armoured deck, rising above which, and extending from the after end of the armoured belt for about two-thirds of the ship forward, is a citadel protected with 3·3-inch armour, with transverse bulkheads of the same thickness of plating. Above again, on the upper deck, is a smaller citadel, also protected with 3·3-inch armour, fore and abaft which, but with their bases protected by the armoured lower citadel, are the two barbettes for the heavy guns, plated with 8-inch armour, and fitted with 2·5-inch steel hoods for the guns. There are further two conning towers, the foremost with 8-inch plating, the after with 2·5-inch. The whole weight of the armour amounts to 1,700 tons. The armament consists of four 24-centimetre (9·4 inch) 40-calibre long Krupp guns, mounted in pairs in the barbettes. Each gun weighs 26 tons, and the mountings for each pair of guns, including the hood, 123 tons. The armour-piercing projectile, which weighs 474 lbs., has an initial velocity of 2,275 feet, and, with an elevation of 25°, has a range of 16 kilometres (10 miles). The secondary battery consists of six 15-centimetre (5·8-inch) Q.F. guns, two 7-centimetre Uchatius guns for boat and landing purposes, sixteen 3-pounder Q.F. guns, and two mitrailleuses with two broadside torpedo-tubes. The six 15-centimetre Q.F. guns are mounted in the citadel on the upper deck, two firing from right ahead to 70° abaft the beam and two from right aft to 70° before the beam; the other two are on the broadside. The guns are separated from each other by steel splinter-proof bulkheads. Ten of the 3-pounder Q.F. guns are mounted on the superstructure over the upper deck citadel. The guns, barbettes, and ammunition hoists are all to be worked by electricity, the ammunition for the heavy guns and secondary battery being provided through separate armoured tubes. The engines are intended to develop 6,000-I.H.P. under natural draught, giving a speed of 16 knots, and 8,500-I.H.P. under forced draught, the corresponding speed being 17·5 knots. The coal capacity is 500 tons, giving a cruising radius of 3,000 miles at 10 knots.—*Militär-Zeitung*.

CHILI.—The new first-class armoured-cruiser "Esmeralda" was launched on the 14th ult. from the yard of Sir W. G. Armstrong and Co., Newcastle-on-Tyne. The principal dimensions, etc., of the vessel are as follows:—Length between perpendiculars, 436 feet; extreme beam, 53 feet 2 inches; draught (mean), 20 feet 6 inches; displacement, 7,000 tons. The vessel is flush-decked, built of steel, sheathed with wood, and coppered. All her machinery, magazines, and steering gear are kept entirely below the curved steel protective deck, which varies in thickness from 1½ inches in wake of the armour belt to 2 inches at the ends. She is also provided with an armour belt 7 feet wide, extending over about 350 feet of her length, and having a thickness of 6 inches. The belt is terminated by 6-inch transverse bulkheads. The coal bunkers are situated above the protective deck, and when filled with coal will add materially to the water-line protection of the ship. Space is provided in the vessel for 1,200 tons of coal at the load draught. Her armament is composed entirely of Elswick Q.F. guns, and is as follows:—Two 8-inch, with heavy shields, placed one forward and one aft, and each having about 270° of training; sixteen 6-inch, two of which are placed on the forecastle and two on the poop, and twelve on the upper deck, two of them firing right ahead and two right astern, while eight can train on each broadside. The auxiliary armament consists of eight 12-pounders, ten 6-pounders, and four Maxims, placed in advantageous positions. In addition she carries three torpedo-tubes, one fitted in the stem above water and two submerged on the broadsides. It is

estimated that she will have a speed of 22½ knots with natural draught. The same firm also launched in February last a second-class cruiser, the "Ministro-Zenteno," for the Government, her dimensions being as follows:—Length, 330 feet; beam, 43 feet 9 inches; and displacement 3,450 tons, with a mean draught of 16 feet 1 inch. Her armament will consist of eight 6-inch, ten 6-pounder, and four 1-pounder guns, all quick-firing.

A new torpedo gun-boat, the "Almirante Simpson," was also launched on the 16th ult. from the yard of Messrs. Laird and Co. at Birkenhead. The vessel is an improvement on the "Almirante Lynch," built by the same builders for Chili some years back, and the "Onyx," built for the British Navy. The dimensions are:—Length, 240 feet; beam, 27 feet 6 inches; draught, 10 feet 6 inches, with 800 tons displacement. The armament consists of one bow and two broadside torpedo-tubes for 18-inch torpedoes, two Armstrong 4·7-inch Q.F. guns, and four Maxim-Nordenfeldt 3-pounders. The machinery consists of twin-screw triple-expansion engines of 4,500-I.H.P. The boilers are of the Normand water-tube type, with a pressure of 200 lbs. The estimated speed is 21 knots. The range of action at 10 to 11 knots speed is about 4,000 knots. The plating of the sides and deck for the length of the machinery space is increased in thickness to afford protection to the engines.

The Government have also entered into a contract with Messrs. Yarrow and Co. for the immediate construction of six first-class torpedo-boats, similar to the "Viper," which the same firm recently built for the Austrian Government. These vessels are to be 150 feet in length, by 15 feet beam, and will be armed with torpedoes and Q.F. guns.

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FRANCE.—The following are the principal appointments and promotions which have been made: Capitaine de Frégate—Salün Penquer to Capitaine de Vaisseau. Rear-Admiral—A. P. Bienaimé to be Chief of the Staff to Vice-Admiral Cavalier de Cuverville, Commanding the Reserve Squadron of the Mediterranean Fleet. Capitaines de Vaisseau—E. L. Gadaud to "Amiral-Duperré"; Z. L. Juhel to "Friedland." Capitaines de Frégate—I. A. Mallet to "Cassini"; A. Schlumberger to Command of Défense-Mobile at Lorient; R. A. Lapotaire to "Amiral-Parseval." —*Le Moniteur de la Flotte.*

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Vice-Admiral Gervais transferred his flag on the 1st ult. to the new first-class battle-ship "Brennus," and on the 15th proceeded with the first and third divisions of the Active Mediterranean Fleet for a prolonged cruise on the Algerian Coast, returning to Toulon, according to the present arrangements, on the 29th June in readiness for the Grand Summer Manœuvres. Vice-Admiral Cavalier de Cuverville, Commanding the Reserve Squadron of the Mediterranean Fleet, has transferred his flag from the third-class battle-ship "Trident" to the first-class battle-ship "Amiral-Duperré," and Rear-Admiral Turquet de Beauregard, the second in command, has shifted his from the last-named ship to the second-class battle-ship "Friedland," which was commissioned on the 11th ult. at Toulon with a complement on the footing of *effectif d'essais*. The new first-class aviso "Amiral-Parseval" has been commissioned to relieve the old wooden third-class cruiser "Beauteemps-Beaupré" in the Pacific. The new first-class battle-ship "Jauréguiberry" has been continuing her preliminary trials at Toulon, which are now completed. During a four hours' run under forced draught, the engines developed 15,800-I.H.P., making 100 revolutions, the mean speed obtained being 18 knots; it should be noted, however, that the ship was light during her trials, not yet having her guns on board; they are now being mounted, and her official trials will then commence. At Brest the new first-class battle-ship "Charles-Martel" has had her armament all placed in position, and she will now commence her official trials. The new second-class cruiser "Bugeaud" has been continuing her trials



at Cherbourg; using two groups of boilers, the engines developed 3,500-I.H.P., making 102 revolutions, and giving a mean speed of 15·5 knots; the consumption of coal per H.P. per hour was 612 gr. (1·5 lbs.); on a four hours' run under forced draught the engines developed 9,500-I.H.P., giving a mean speed of 18·9 knots.

On the 27th ult., at Lorient, the new first-class battle-ship "Bouvet" was successfully launched. She is the largest battle-ship as yet constructed or building for the French Navy, and her dimensions are as follows:—Length, 401 feet 2 inches; beam, 70 feet 3 inches; and with a maximum draught of 27 feet 6 inches, she has a displacement of 12,205 tons. The engines are to develop 14,000-I.H.P., giving a speed under forced draught of 17·5 knots; there are three sets of engines driving three screws, and the boilers will be of the Belleville water-tube type. Protection is afforded by a water-line belt 16 inches thick amidships, and tapering to 8 inches at the bow and stern; there are two armoured decks, the upper one being 3·8 inches thick; the barbettes for the heavy guns will be protected by 14·5-inch armour, and the turrets for the 6-inch Q.F. guns by 4 inches; all the armour will be of special steel treated with nickel and manganese. The heavy armament will consist of two 30-centimetre (12-inch) guns in closed turrets, one forward and one aft; of two 27-centimetre (10·8-inch) guns also in turrets, one on each beam; these guns are of the latest (1893) model, and the breech mechanism can be worked by hand. The ammunition hoists discharge alongside the gun, and the projectiles are conveyed by means of an overhead rail, either directly to the loading position or to a rack made to contain eleven projectiles. The loading is done by hand, while the turrets are trained by hydraulic power, which is also used for the elevation of the guns. The secondary battery consists of eight 14-centimetre (5·5-inch) Q.F. guns (model 1891) and eight 10-centimetre (3·9-inch) Q.F. guns, also of the 1891 model. The eight 14-centimetre guns are in armoured turrets in couples, four firing right ahead and four astern, these turrets being in close juxtaposition to those of the heavy guns. The elevation is by hand, while the turrets can be worked either by hand or hydraulic power, as also can the ammunition hoists. The eight 10-centimetre guns are on the superstructure on central pivot mountings with 2-inch shields for protective purposes. There are, further, twelve 3-pounder Q.F. guns and twenty 1-pounder Q.F. guns distributed on the bridges and in the tops, with four torpedo-discharges, two of which are under water.

The new third-class cruiser "Galilée," a vessel of the "Linois" type, was launched at Rochefort on the 28th ult. With her sister, the "Lavoisier," she has been designed by M. Albaret, and her total cost will be £208,000. Her dimensions are as follows:—Length, 330 feet; beam, 34 feet 6 inches; and with a draught of 17 feet 10 inches she has a displacement of 2,300 tons. Her armament consists of four 14-centimetre (5·5-inch, model 1887) Q.F. guns, in sponsons two on a side, two 10-centimetre (3·9-inch, model 1891) Q.F. guns, one forward and one aft, eight 3-pounder Q.F. guns, and eight 1·4-inch Q.F. guns. There are two above-water torpedo-tubes. The six heavier guns will have 2-inch steel shields, and the ship has a protective deck 1·5-inches thick. The engines are of the vertical triple-expansion type, supplied by Belleville boilers, working up to 4,000-I.H.P. (normal) and 6,600 with forced draught, and the nominal corresponding speeds are 18 and 20 knots, but it is hoped the latter will be exceeded. The bunker capacity is 226 tons, giving a range of 3,000 miles at 10 knots and 600 miles at full speed.

The following account of some practice lately carried out by the "Amiral Duperré" and "Sfax" with *mélinite* shells is taken from the columns of the *Yacht*, and may be found of interest:—

"It will be remembered that towards the end of January last the "Amiral-Duperré" and the "Sfax" carried out some experimental firing against



specially erected fortification on the "Île de Levant," in accordance with an agreement arrived at between the War Department and the Ministry of Marine.

In a report of these experiments printed by a military contemporary, we read the following :—"The effect of the *mélinite* was overwhelming, in a few minutes the forts were reduced to dust."

The above-quoted sentence contains certain errors of fact which it is desirable should not be generally accepted. If our information is correct, far from having been reduced to dust, the works, on the contrary, suffered little, and this notwithstanding the remarkable accuracy of the firing, from which may be drawn the conclusion that modern fortifications can resist the destructive effects of the artillery of to-day without incurring much damage.

To come to the facts of the case. The "Amiral-Duperré" and the "Sfax" had each been directed to carry out several series of firing, during which the direction of the course, the speed, the end to be attempted, and the nature of the firing were changed, each series occupying about three-quarters of an hour. During the experiments, which lasted altogether six hours, more than 1,000 shots were fired from guns of 34 centimetres, 16 centimetres, 14 centimetres, and 10 centimetres (13·3 inches, 6·2 inches, 5·5 inches, and 3·9 inches), which works out at a little over two shots a minute per ship, a certain number of shell being filled with *mélinite*. Finally, as it was necessary to examine the effects of the fire after each series, the experiments had to be spread over a period of three days.

We will now give a brief description of the fortifications. These consisted of two batteries constructed by the engineers after the most approved fashion, and in which were represented very accurately, by models and dummies, the guns with their gun detachments and accessories. In each battery was simulated an armament of eight guns, four of heavy and four of medium calibre. One of the batteries on the slope of the island had an altitude of 20 metres (65·6 feet), the second, crowning the crest of the island, had a command of about 100 metres (328 feet). We do not think we are wrong in saying that more than half the dummies of the gun detachments were hit, and that about one-quarter of the guns were dismounted or more or less damaged. As regards the harm done to the forts themselves, we repeat, this was insignificant, both from the shells filled with *mélinite* and those filled with black powder. The *mélinite* shells, which burst into very small pieces, would have been particularly deadly to the *personnel*. Some fragments were found at more than 1,000 metres (1,093 yards) from the batteries, proving the enormous initial velocity produced by the explosion. Such were the results obtained, and should we have occasion to fight an enemy afloat, the destructive effects on a vessel, whether armoured or not, would be tremendous, as to the fragments of the projectiles would be added the *mitraille* occasioned by flying splinters of metal from the neighbourhood of the explosion. Under such conditions the *personnel* would, without doubt, suffer in still more deadly proportion.

It is necessary to call attention to the advantages that forts possess in being able to draw on a practically unlimited supply both of men and ammunition, and also that the defence would continue as long as the work is tenable and a gun remains fit to fire. To dismount a few guns and put out of action a fair number of their gunners (who could have been replaced from others held in reserve), we estimate that the "Sfax" and the "Amiral-Duperré," found it necessary to fire 40,000-kilogrammes (39·3-tons) weight of projectiles. During the last Continental war it was calculated that for every man killed his weight in metal had to be fired, a statement which at first appeared exaggerated, or at least surprising, but in the experiments under consideration not less than nine or ten times his weight in metal was required to remove one man of the defence. Such are the disadvantageous conditions under which ships are placed when contending against well-constructed fortifications. If, on the other hand, we suppose that the sixteen guns which served as a target had replied to the fire of the "Amiral-Duperré" and the "Sfax," we may presume that the two vessels would have been several times hit and have

received some serious damage. A single shell of 249 millimetres (9·5 inches) fired from the commanding position of the battery on the crest, would have been most dangerous to the armoured decks, and in any case would have produced destructive results.

Let us now consider the case of two vessels similar to the "Sfax" and "Amiral-Duperré," unloading their shell rooms in a few hours of 40,000-kilogrammes (39·3-tons) weight of projectiles, on an enemy's coast at perhaps a long distance from their base of supplies. Should they be suddenly attacked by a hostile squadron, would they not be in danger of capture unless a great superiority of speed and an absence of all serious injuries permitted their escape? It has been said that one of the advantages possessed by ships when attacking forts is that they retain the power to retire if overmatched, but this is quite a negative advantage. The truth is that a ship-of-war must be always a compromise between offensive power and defensive power plus speed, the latter being rigorously limited by the weight of hull and weight carried, a ship being, above all things, also peculiarly vulnerable. A fort, on the other hand, firmly constructed on the land, built of materials whose nature and disposition are calculated solely with a view to resistance to gun-fire and without regard to weight, will always have the advantage, provided it be armed with guns of equal power worked by gunners as highly trained as those of its floating enemy. These conclusions are not new, but have always been admitted, and the enormous progress made in the science of artillery does not invalidate them.

We admit that a fleet may always with advantage steam past one or several forts with the intention of forcing a passage, but it would be more dangerous than useful to undertake their destruction by regular attack. The bombardment of Alexandria and the destruction of the forts at Fou-Chow, when the results are carefully examined, support all that has been said.

The English were not under any illusions regarding the lessons to be drawn from their success at Alexandria. The *United Service Gazette* at this time stated as follows:—"If the forts of Alexandria had been armed with more efficient guns, like those to be met with on the French and German coasts, and had these guns been served by French or German gunners, the result of the struggle would have been far different. We should in all probability have had at least a third of our fleet, if not sunk, at any rate put out of action, and for all practical purposes lost to us."

The English fleet had five killed and twenty-eight wounded, and the ships received about ninety hits on their hulls. Given the feeble means of defence possessed by the Egyptians, it is surprising that they were able to sustain so crushing a fire for the space of four hours; and the relative efficiency of their practice proves that the conclusions of the *United Service Gazette* are, perhaps, below the truth.

As regards the operations in the River "Min," they consist, as is well known, of a naval combat, followed by the methodical and successful destruction of the fortifications echeloned between the "Pagoda" anchorage and "Kimpai" narrows. Of the naval combat nothing need be said, except that it resulted in a loss to the Chinese of twenty-two vessels or junks, and the death of 5 captains, 39 officers, and 2,000 sailors or soldiers, whilst our losses only amounted to 6 killed and 27 wounded; such were the results obtained in a half-hour's action. The destruction of the arsenal and the fortified works remained to be carried out, some of the latter being casemated and thickly armoured. After the destruction of the fleet some batteries on shore still continued firing, among the guns placed on a hill commanding the arsenal being three Krupp field-pieces, which were only silenced after an hour's cannonading. In the destruction of the arsenal undertaken on the morrow, only the small craft armed with 14 and 10-centimetre guns (3·9-inch and 5·5-inch) were able to

take part; "the fire," said Admiral Courbet, "did great damage, but not so much as I could have desired; with guns of 14-centimetre one could not do more."

The 14-centimetre guns were still more powerless against the forts, which it was necessary to destroy one by one, taking them in reverse. This task fell to the 24-centimetre (9·4-inch) guns of the "Triomphante" and those of 16-centimetre (6·3-inch) of the "Duguay-Trouin," a service made all the more difficult by the strength of the current. The skill with which this operation was directed and executed is well known, but it must be noted that it occupied five days! The naval action had been decided in half-an-hour on the 23rd August, and it was only on the 29th that the fleet could pass the magnificent armoured casemates of the "Kimpai" and the "White Fort," which had been reduced to ruins. It had been found necessary to demolish them embrasure by embrasure, firing at distances varying between 200 and 600 metres! (218 and 656 yards).

Such are the facts which it has seemed to us of interest to recall, so as to show how difficult is the task which awaits vessels that may have to engage fortifications, and how dangerous it would be to imagine that a few *mélinite* shells would suffice to reduce the latter to dust.

In conclusion, we express a wish that the gunnery school-ship may, during each course of instruction, carry out some experimental firing against the batteries on the "Île de Levant," particularly by broadsides fired rapidly in succession. We consider these exercises to be absolutely indispensable both for the men under training and for our future gunnery officers."—*Le Yacht, Le Moniteur de la Flotte, and Le Temps.*

GERMANY.—The following are the principal promotions and appointments which have been made: Vice-Admiral Hollmann to be Admiral; Korvetten-Kapitän—Fischer, Breusing, and von Halfern to be Kapitän zur See. Rear-Admiral—Tirpitz to command of the Cruising Division, vice Hoffman. Kapitän zur See—von Ahlefeld to "Stein"; Hofmeier to "Gneisenau"; von Eickstedt to "Gefion"; Schmidt to "König Wilhelm"; Heffner to Inspector of the East-Friesland and Jade Coast District; Wachenhusen to Inspector of the West Schleswig-Holstein and Elbe Coast District; von Wietersheim to Superintendent of Dockyard at Danzig. Korvetten-Kapitän—Zeye to "Kaiser"; du Bois to "Irene"; von Usedom to "Jagd"; Palmgrön to "Carola"; Follenius for service at the Ministry of Marine; Grolp to command of Torpedo-boat Flotilla; Meyer to "Condor"; Friedrich to "Wacht"; Derzewski, Kalau von Hofe, and von Dassel, to command of "Frithjof," "Siegfried," and "Hildebrand," respectively, during the summer grand manœuvres.—*Marine Verordnungsblatt.*

The different squadrons have been constituted as follows for the manœuvre season of 1896, etc.:—The Manœuvre Squadron remains under the command of Vice-Admiral Koester, with Kapitän zur See Geissler as Chief of the Staff, and Rear-Admiral von Arnim as second in command, and consists of the following ships:—

First Division—

First-class battle-ships—"Kurfürst Friedrich Wilhelm" (flag-ship of Commander-in-Chief), "Brandenburg," "Wörth," "Weissenburg."

Despatch-vessel—"Jagd."

Second Division—

Second-class battle-ships—"König Wilhelm" (flag-ship of Rear-Admiral), "Sachsen," "Württemberg."

Despatch-vessel—"Wacht."

Torpedo-boat Flotilla—

Torpedo-avisos—"Blitz."

Division boats—"D 7," "D 9."

Torpedo-boats (first class)—58, 59, 60, 61, 62, 63, 64, 65, 74, 75, 76, 77, 78, 79, 80, 81.

## School-ship Division—

Frigates—"Stosch," "Stein," "Moltke," "Gneisenau."

## Cruising Squadron—

Second-class battle-ship—"Kaiser" (flag-ship of Commander-in-Chief).

Second-class cruisers—"Irene," "Prinzess Wilhelm."

Third-class cruiser—"Arcona."

The following ships are further stationed abroad :—

## On the China Station—

The fourth-class cruiser "Cormoran" and the gun-boat "Iltis."

## On the Australian Station—

The fourth-class cruisers "Falke" and "Bussard" and the surveying-ship "Möwe."

## On the East Coast of Africa—

The fourth-class cruisers "See-Adler" and "Condor."

## On the West Coast of Africa—

The fourth-class cruiser "Sperber" and the gun-boat "Hyäne."

## In the Mediterranean as stationnaire at Constantinople—

The despatch-vessel "Loreley."

The following vessels are under the orders of the Commander-in-Chief at

## Kiel :—

Imperial yacht—"Hohenzollern."

Fourth-class coast-defence battle-ships—"Hagen," "Heimdall."

Third-class cruiser—"Gefion."

Despatch-vessel—"Grille."

## Reserve Division at Danzig—

Armoured gun-boats—"Mücke," "Skorpion."

The following vessels are under the orders of the Commander-in-Chief at

## Wilhelmshaven :—

Second-class cruiser—"Kaiserin Augusta."

Surveying-vessel—"Albatross."

Despatch-vessel—"Meteor."

*North Sea Reserve Division.*

Fourth-class coast-defence battle-ships—"Beowulf," "Siegfried."

To these ships will be added for the summer manœuvres two others of the same class, the "Hildebrand" and the "Frithjof," the squadron then being placed under the orders of a Rear-Admiral.

In addition to the ships above-mentioned, the "Mars" and "Carola" remain as the Gunnery School ships, the "Friedrich Carl" and "Blücher" doing duty as the Torpedo School ships.

The necessary Votes having been approved by the Reichstag, the Ministry of Marine has accepted the tender of the Vulcan Yard at Stettin for the construction of the second-class cruiser "N"; the ship is to be completed in two years-and-a-half. A cruiser of a similar type was commenced in October last year at the same yard, which is to be completed in twenty-five months from the date of commencement. It has also been decided that the new first-class battle-ship Ersatz "Friedrich der Grosse" is to be laid down at Wilhelmshaven, and the second-class cruiser "M" at the Imperial dockyard at Danzig. The fourth-class cruiser "G" is also to be built at a private yard, but the contract has not yet been given out. Altogether there are under construction or to be commenced in the Imperial dockyards the two first-class battle-ships Ersatz "Preussen" and Ersatz "Friedrich der Grosse," the first-class armoured-cruiser Ersatz "Leipzig," and the two second-class cruisers, Ersatz "Freya" and "M"; while in private yards are already building or to be commenced three second-class cruisers "K," "L," and "N," and the fourth-class cruiser "G." According to present arrangements, it is hoped that the launch of the first of these ships, one of the cruisers, will take place in the autumn. Each of the five new cruisers are to have

three screws, the engines being in separate compartments; the I.H.P. to be developed is 10,000, giving a speed of 22 knots. The guns are to be in 4-inch armoured casemates, and the armoured deck will also be 4 inches thick.

The Ministry of Marine has determined to construct a large coaling station at the Eastern entrance to the Kaiser-Wilhelm Canal, and the necessary works are to be commenced this summer; the coal depôt is to be 566 feet long, with a depth of 68 feet, and will be placed on the South bank of the entrance to the canal, and immediately adjoining the new torpedo-boat harbour; it will be connected by rails with a mole 890 feet long, the water alongside which will be of sufficient depth to allow the largest battle-ship to come alongside and take in her coal. Hydraulic cranes are to be provided. The whole work is to be completed in two years. A similar coaling station is to be constructed at the Brunsbüttel harbour, at the Western entrance of the canal. At both depôts 77,000 tons of coal are to be stored.

The new torpedo-avis "Comet" has at last concluded her trials with very satisfactory results; she is a vessel of 956 tons, and was launched as long ago as the 15th November, 1892, and has been four times since 1893 commissioned for trials, but on each occasion has had to return to the dockyard for alterations and improvements. At her last four hours' run under forced draught, with the engines making 214 revolutions a minute, a mean speed of 21 knots was obtained without pressing the engines to their full power. The new despatch-vessel "Hela," built by the Weser Company at Bremen, is to commission immediately for her trials; she is a vessel of 2,000 tons, and the engines are to develop 6,000-I.H.P., giving a speed of 21 knots.

The second-class battle-ship "König-Wilhelm" was commissioned on the 16th ult., at Wilhelmshaven, as flag-ship of the Second Division of the Manœuvre Squadron in place of the "Baden"; the crew of the latter ship being transferred to her. The new fourth-class coast-defence ship "Ægir" has received her armament, and is to commence her trials during the latter part of this month. The naval authorities have purchased three old sailing-ships to be used as floating targets for the fleet during the manœuvres.

The Summer Session at the Naval Academy at Kiel opened on the 20th ult., when the cadet-aspirants, who had passed the entrance examination, joined. Of the newly-promoted cadets, 15 have been embarked on board the training-frigate "Stein," 15 on board the "Stosch," 16 on board the "Moltke," and 15 on board the "Gneisenau"; it is reported that the foreign cruise of these four training-frigates will, instead of six, be extended to nine months, when they leave this year for abroad after the manœuvres.—*Marine Verordnungsblatt, Kieler Zeitung, and Neue Preussische Kreuz Zeitung.*

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JAPAN.—On the 31st March was launched from the yard of the Thames Ironworks Company the new battle-ship "Fuji"; she has been designed by Mr. G. C. Mackrow, naval architect of the Thames Ironworks Company, and her keel plate was laid on September 1st, 1894. She is 374 feet long between perpendiculars, has a moulded breadth and depth of 73 feet and 44 feet respectively, and her displacement at the mean load draught of 26 feet 3 inches will be 12,450 tons. She is built on the bracketed system, and has the usual cellular double bottom. The whole of the material used in her hull is steel, the stem—which is ram-shaped—stern and rudder frames, and brackets for propeller shafts are malleable steel castings. The rudder is on the balanced principle, a form now being adopted in both battle-ships and cruisers. Bilge keels, of about half the length of the ship and 2 feet 6 inches wide, are fitted to her bottom.

The "Fuji" is side-armoured with Harveyized steel plates for 226 feet of her length, the lower or main armour belt being 8 feet in depth (3 feet being above and 5 feet below the deep-load water-line), 18 inches thick at the mid-length and 16 inches at the ends. Above the main armour-belt there is a secondary one—for the

protection of the battery—7 feet wide and 4 inches thick, slanting off at its ends to meet the armoured sides of the barbettes, both belts having a backing of teak—to which they are bolted—bringing up the thickness of the vessel's sides at these parts to 22 inches. At both ends of the main armour-belt a screen of 6-inch armour runs square across the main and lower decks to protect the guns from a raking fire.

There are four principal decks in the ship—viz., the upper, main, protective, and lower decks. At the level of the top of the main armour-belt—whose length includes the whole of the machinery space—a flat protective deck of steel  $2\frac{1}{2}$  inches thick extends across the ship. This deck is continued—but at a lower level—to both bow and stern, terminating forward in a powerful ram. Barbettes of the usual pear-shaped form in plan are built at each end of the battery, and are plated with 14-inch steel armour between the main and upper decks, and with 9-inch armour down to the protective deck on which they stand. There is a conning tower over the rear end of the forward barbette, plated with 14-inch Harveyized-steel armour, and a director tower in the same position on the after barbette, plated with 3-inch similar armour. Vertical-armoured ammunition-hoists or shafts lead from the magazines and shell rooms—which are in the lowest parts of the ship, forward and aft—up to the interior of the barbettes, directly in rear of the breech ends of the heavy guns. Passages, which go round the whole of the machinery space at the lower deck level, connect the two main ammunition hoists, and, having the armour-belts and side bunkers for protection throughout their length, are made the means of serving the 6-inch guns in the battery, through separate hoists, with their ammunition.

The armament of the "Fuji" comprises four 12-inch breech-loading 49-ton guns, two being carried in each barbette; ten 6-inch Q.F. guns, three of which are disposed on each side of the upper and two on each side of the main decks; the upper deck guns being protected by heavy steel shields, and those on the main deck by casemates plated with 6-inch nickel steel armour. There are also carried twenty 3-pounder and four  $2\frac{1}{2}$ -pounder Hotchkiss Q.F. guns, the 3-pounders being distributed on the bulwarks, main deck, and the bridges, and the lighter guns carried in the tops. The barbette guns will fire through an arc of  $240^\circ$ , the forward and after 6-inch guns in the battery through  $150^\circ$ , or  $90^\circ$  before and  $60^\circ$  abaft the beam; and the midship 6-inch guns through  $120^\circ$ , or  $60^\circ$  both before and abaft the beam. There are also five 18-inch torpedo-ejectors, four being below water and one above. The ship will be fitted with two military masts with double fighting tops, and with derricks for lifting the boats in and out board. Thirteen boats in all will be carried, including two vedette torpedo-boats. The whole of the ship will be lighted by electricity, and there will be five search-lights fitted.

The propelling machinery of the "Fuji" is by Messrs. Humphrys, Tennant, and Co., of Deptford, and consists of two sets of three-cylinder vertical triple-expansion engines, driving twin-screws. They are designed to develop 14,000-I.H.P., on trial, with moderate forced draught to the boilers. The design of the engines is one of great simplicity, all the working parts being very accessible. Everything about them has been made in accordance with English Admiralty requirements, and they are almost identical—except in having a longer stroke of piston—with those now fitting by Messrs. Humphrys and Co., on board the "Prince George," at Portsmouth. Steam for the engines of the ship will be supplied by ten single-ended four-furnaced boilers, of the ordinary cylindrical marine type. The boilers will be placed in four water-tight compartments, or boiler-rooms, three in each of two boiler-rooms, and two in each of the others. The coal carried at the normal load draught of the ship is 700 tons, but there is bunker capacity provided for 1,200 tons. The average thickness of coal (serving as protection to the machinery space) in side bunkers is about 10 feet. The two main engine-rooms in the ship, which have each a midship fore and aft water-tight

bulkhead, are divided by a space about 9 feet in width, which is utilised for engineers' workshops and engineers' and gunners' store-rooms, etc.

From these details it will be seen that the "Fuji" will be an exceptionally powerful fighting ship; for although she only exceeds in displacement by 100 tons the "Renown," she is more heavily armed and armoured, the heaviest ordnance of the latter vessel being 10-inch 29-ton guns, and her thickest armour 10 inches.

The "Fuji" is intended for a flag-ship, and her complement will be about 600. She will be launched with all her side armour in place, and her launching weight will be close upon 7,500 tons.—*The Times*.

## MILITARY NOTES.

### PRINCIPAL PROMOTIONS AND APPOINTMENTS DURING APRIL.

Lieut.-General E. F. Chapman, C.B., R.A. (late Bengal), to be General; Major-General C. Tucker, C.B., to command a First-class District in India; Lieut.-General J. Le M. Tupper, retired list R.A., to be Colonel-Commandant, R.A.; Lieut.-General G. D. Barker, C.B., to be Governor and Commander-in-Chief of Bermuda; Major-General B.A. Combe, C.B., to command the Curragh District; Major-General Sir F. Carrington, K.C.M.G., commanding Infantry Brigade, Gibraltar, to command the operations in Matabeleland; General Sir E. C. S. Williams, K.C.I.E., R.E. (late Bengal), granted an extension of twelve months as Director-General of Railways, India Office; Colonel Sir J. C. Ardagh, K.C.I.E., R.E., to be Director of Military Intelligence at Head Quarters, with the temporary rank of Major-General; Surgeon-Major-General W. R. Rice, M.D., C.S.I., to be Honorary Physician to the Queen; Surgeon-Colonel W. Taylor to be Surgeon-Major-General, in recognition of his services in Ashanti.

The following are the most interesting passages in the instructions issued to Colonel Sir R. E. R. Martin, late 6th Dragoons, relative to the permanent control of the armed forces in the territories of the Chartered Company, and the instructions issued to Major-General Sir F. Carrington, K.C.M.G., relative to military operations to be carried out against the Matabele:—

In the territories south of the Zambesi under the direct administration of the British South Africa Company, Sir R. Martin's duties will be those of Commandant-General of the armed or disciplined forces maintained by the Company. These will include:—

- A white force of armed and mounted police;
- A force of native armed foot police;
- A force of municipal police, partly white and partly native.

As regards the mounted white police, he will be exclusively responsible to the High Commissioner. His authority will extend to the recruiting, organisation, discipline, internal economy, location, and employment of the force. The chief reason for the assumption by the Imperial Government of the control of the police is to secure that there will be no renewal of that untoward event which led to the recent change, and that no use will be made of the force which is unjust in itself or contrary to law and international obligations. At the time of the outbreak of the Matabele rebellion the strength of the white mounted police had fallen to about that of one troop. When the rebellion is over it will doubtless be necessary to maintain a considerably larger force; but as to this he will report in due course after consultation with the local administration. No officer or trooper will be permitted to obtain or retain shares, or interests in any South African venture inside or outside the Company's territories.



Sir Frederick Carrington is informed in the second despatch that the forces under his command consist of about 300 men of the 7th Hussars, such number of the mounted infantry now in South Africa as can be spared from their regiments, a column of about 720 Colonial Volunteers raised by Colonel Plumer, D.S.O., at Mafeking, and various police and Volunteer forces, scouts, native levies, etc., serving in Matabeleland itself or with Colonel Plumer. There are in the Bechuanaland Protectorate, besides some Cape Police (serving in connection with cattle plague), a troop of white mounted police, and another troop of Basuto mounted police. These two troops will also be under his orders, but, as at present advised, they should not be used directly in connection with the operations in Matabeleland, as some force ought to be retained in the Protectorate.

Besides an additional battalion of the line, Her Majesty's Government are sending to the Cape a body of men trained as mounted infantry, who will number about 480 in all. These additional troops will be landed at Cape Town, and, forming as they do part of the Regular garrison of the station, it is not expected that their services will be required at the front, but, if they should be required, application will be made to the High Commissioner. They will also be available in order to repair the waste of war amongst the Regulars at the front.

As regards the police and local Volunteer forces raised in the Chartered Company's territories by officers in the service of the company, Her Majesty's Government have decided, in consequence of recent events, that all the armed and disciplined forces raised by the company must come under the control of Imperial officers. Sir F. Carrington's authority is plenary over every armed man serving in the operations against the Matabele inside or outside the company's territories, and over every person exercising functions in connection with the direction, transport, supply, etc., of such forces, or with the fortification of positions or the maintenance of lines of communication. His authority as supreme commander in the field will last until the power of the rebels is declared by the High Commissioner to be broken and their forces are dispersed.

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The organisation and composition of the Egyptian Army is doubtless familiar to many British officers, but there are, on the other hand, a large number who might be interested in a brief description of the Force as it exists now. Previous to 1882, it had been trained by American officers, soldierly men of varied experience; but they were permitted to have little or nothing to do with the actual training of the men; they were chiefly employed on staff duties in connection with topographical and other work, and in explorations in the Sudan, and in the deserts between the Nile and the Red Sea. The Army was, however, disorganised by Arabi Pasha, and hordes of raw levies were introduced into it before the catastrophe of Tel-el-Kebir.

On the 20th December, 1882, appeared the decrees of His Highness the Khedive disbanding the old Army, and appointing Major-General Sir Evelyn Wood, V.C., G.C.M.G., K.C.B., as Sirdar of the new Army. Permission was given for the appointment in Egypt of officers serving on full pay in the Queen's Army, and twenty-five officers were provisionally selected, many of whom have since risen to eminence. The number of the Army was fixed at 6,000 men. It was to be a fellahin Army, but, in view of the high reputation of Turkish soldiers, it was decided that it "would be wise to introduce a certain amount of professional backbone into the invertebrate ranks of the fellahin soldiers, by the admission among them of those hardy warriors who carried the standards of Mohammed Ali from Cairo to Konia." The original conditions of service were four years with the colours, but this was subsequently altered to four years in the Army, four years in the Police, and four years in the Reserve. And in 1888, finding that with the continual chances of active service in the field it would have been most unwise to have dispensed with the older and well-trained soldiers,

the period of service was again altered to six years in the Army, five in the Police, and four in the Reserve.

The following table shows the English rank and its equivalent in the Egyptian Army. The ranks of Sirdar, Farik, and Lewa carry with them the title of "Pasha," the ranks of Miralai, Kaimakam, carry with them the title of "Bey." All lower ranks to second lieutenant carry with them the title of "Effendi"; but in this case the title has dropped into disuse when applied to British officers serving in the Egyptian Army:—

Commander-in-Chief	...	...	...	Sirdar.
Lieutenant-General	...	...	...	Farik.
Major-General	...	...	...	Lewa.
Colonel	...	...	...	Miralai.
Lieutenant-Colonel	...	...	...	Kaimakam.
Major	...	...	...	Bimbashi.
(Adjutant-Major)	...	...	...	Saghkotaghasi.
Captain	...	...	...	Yuzbashi.
Lieutenant	...	...	...	Mulazim awal.
Second Lieutenant	...	...	...	Mulazim tain.

In January, 1883, the Army, in addition to the Staff, consisted of one cavalry regiment, two batteries of six guns, two batteries of four guns, and eight battalions of infantry formed into two brigades. When a recruit is once called up to the colours, his service begins in the dépôt battalion at Cairo, where he undergoes three months' preliminary training, and is then drafted off to a battalion, either on the frontier, or at Suakin, or at Cairo. If, on the completion of his first period of service, he does not elect to serve on, he is drafted into the Police to spend his second period of service. The Police is the first reserve of the Army, and should a sudden emergency render it necessary to increase the number of trained soldiers, such increase would be drawn from the Police, which in turn would fill up its vacancies from the first-class reserve. On completion of his Police service the soldier is drafted to the first-class reserve, which is tantamount to release from service, as the Reserve is seldom called out.

The Staff of the Egyptian Army is on the lines of that in the British Army. The native officers of the Army are supplied from the Military School, which they enter as cadets, and remain in for about two years. They are trained in accordance with the English military system, and are fairly acquainted with the British infantry drill. An English officer, on joining the Egyptian Army, is, as a rule, granted the next higher rank, or in some cases two ranks higher, than that he possesses in the British Service, but no English officer has a lower rank than Bimbashi or Major. In English officered battalions there are consequently no native officers of higher rank than Adjutant-Major. But there are battalions entirely officered by native officers.

The most reliable men in the Egyptian Service are the Sudanese, the first battalion of which was raised on 1st May, 1884, and commanded by Major H. Hallam Parr, C.M.G., and from its earliest formation up to the present time the confidence placed in it by the British officers has never once wavered. It was the pioneer regiment of the Sudanese Brigade which has since proved itself to be the backbone which the Egyptian battalions so much require, and which, in combination with the native troops, has secured more than one honourable victory. The Sudanese battalions are not composed of conscripts, the men are mostly deserters from the enemy, and they are almost entirely volunteers. They are organised into six company battalions, with four officers per battalion of 759 men.

In 1885, Sir Evelyn Wood was succeeded as Sirdar of the Egyptian Army by the present Major-General Sir Francis W. Grenfell, G.C.M.G., K.C.B., who retained

office until 1892, when Colonel Sir H. H. Kitchener, K.C.M.G., C.B., A.D.C., R.E., was appointed. The present strength of the Egyptian Army is:—

*Cavalry*.—Eight squadrons.

*Camel Corps*.—Six companies, two of which are fellahin, and four Sudanese.

*Khedive's Camel Corps*.

*Artillery*.—One Horse Artillery Battery, two Mule Batteries (often spoken of as Field Batteries), one Maxim-Nordenfeldt Battery, and four companies of Garrison Artillery.

*Infantry*.—Fourteen Battalions, and two Reserve Battalions. Nos. 1 to 8 are Fellahin Battalions, of which Nos. 5, 6, 7, and 8 are officered entirely by Egyptian officers. Nos. 9 to 14 are Sudanese Battalions, all commanded by British officers. Nos. 15 and 16 are Egyptian Reserve Battalions.

The following is the Head Quarter Staff:—

*Sirdar*.—Brevet-Colonel and Brigadier-General Sir H. H. Kitchener, K.C.M.G., C.B., A.D.C., R.E.

*Adjutant-General*.—Colonel H. M. L. Rundle, D.S.O., R.A.

*Assistant Adjutant-General*.—Major E. F. David, R.M.L.I.

*Deputy Assistant Adjutant-General*.—Lieutenant G. F. Gorringe, R.E.  
Lieutenant N. E. Playfair, King's Own  
Scottish Borderers.

*Assistant Military Secretary*.—Major J. G. Maxwell, D.S.O., Black Watch.

*Principal Medical Officer*.—Surgeon-Lieutenant-Colonel T. J. Gallwey, M.D.,  
Medical Staff.

*Director of Supplies*.—Lieutenant-Colonel J. Rogers, Army Service Corps.

*Director of Stores*.—Captain W. S. Gordon, R.E.

*Director of Military Intelligence*.—Major F. R. Wingate, C.B., D.S.O., R.A.

*Assistant Director of Military Intelligence*.—Colonel Slatin Pasha, C.B.

It is to be hoped that, after the sad lessons of the last few weeks, the colours of British regiments will never again be handed over to the tender mercies of individuals, no matter how distinguished may have been their services, nor how closely connected the officers may have been with the regiments concerned. A few weeks ago the Peninsula colours of the 38th, now the 1st Battalion South Staffordshire Regiment, were offered for sale by auction by Messrs. Sotheby, Wilkinson, and Hodge, in London. They were presented to the regiment about 1809, before it embarked for the Walcheren Expedition; and the 38th fought under them at Roleia, Vimiera, Corunna, Busaco, Badajos, Salamanca, Vittoria, St. Sebastian, and the Nive. In 1824, when the regiment obtained new colours, the old set were presented to their Colonel, Sir Edward Miles, K.C.B. He was then in command of the regiment, and had distinguished himself under these colours in the Peninsula. Partly in recognition of these services, and partly because his wife, Lady Miles, had saved the colours at one time at great personal risk when the barracks were on fire, the regiment in 1824 presented the old colours to their Colonel. When he died, in 1848, the colours became the property of his son, and subsequently of his grandson. Inconceivable as it may appear, this gentleman has actually sold these colours back to his grandfather's old regiment. Now that Lieut.-Colonel Horsbrugh and the officers are again in possession of these relics, they will probably take steps to prevent their ever again being subjected to such indignities as those which they have recently experienced.

On the 5th inst. was sold at Messrs. Sotheby's to a dealer, for the sum of £35, the King's colours of the 2nd Battalion of the 72nd Highlanders. This

battalion was raised in Scotland, under the Additional Forces Act, in 1804, and was disbanded at Londonderry in 1815, when the colours are believed to have come into the possession of the commanding officer. But here, again, the owner, instead of presenting them to the regiment to which they belonged, put them up for sale. The safest haven of rest for the retired colours of British regiments is the Museum of the Royal United Service Institution; and it is to be hoped that more regiments will follow the example set by the 43rd and 52nd Light Infantry, which have adopted the wise course of depositing theirs at Whitehall.

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ARGENTINE REPUBLIC.—*The Army of the Argentine Republic in 1896.*—The Argentine standing army consists of 1 regiment of engineers, 3 brigades of field artillery, 1 brigade of mountain artillery, 16 regiments of infantry of 1 battalion each, and 11 regiments of cavalry of 3 squadrons each.

The engineer regiment retains its old organisation, and its sapper, pontoon, telegraph, and railway companies, until it receives its new equipment, which is being purchased in Europe. Each of the four artillery brigades consists of two regiments of 3 batteries each; there are six guns to the battery. The regiment is commanded by a lieutenant-colonel, the brigade by a colonel, and the united brigades form a division under the command of a general.

In 1895 there were twelve battalions serving as the nucleus of twelve regiments, to which four new battalions have now been added. In like manner, the 11th Cavalry Regiment has been newly established.

An Argentine commission has been employed in Essen, supervising the construction of 180 field guns, which have been ordered from Krupp, and by means of which the Republic will be able to place in the field thirty batteries of six guns.—*Deutsche Heeres-Zeitung.*

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AUSTRIA-HUNGARY.—Experiments are about to be made, with a view to signalling losses in the course of a manœuvre. During the year 1896, in all manœuvres of troops against one another, including those of division against division, "indicating flags" will be used to signal the effect of the enemy's fire. All companies and batteries will be provided with flags of that kind. They will be displayed on the order of the director of the manœuvre, or the umpire, as soon as the troops engaged have suffered sufficient loss to show the marked superiority of the enemy's fire. The commander of units will also be at liberty to display their indicating flags, with the object of pointing out that they are exposed to overpowering fire, but that fact will not be allowed to interfere with the final decision. In the month of October the commanders of corps will report whether the employment of indicating flags is desirable in the instruction of officers.—*Revue du Cercle Militaire.*

The Austrian manœuvres this year are to be carried out in two chief groups: one in Galicia, the other on the frontier between Cisleithania and Transleithania. The officers and cadets of the Reserves are to be called out in February, and none are to be granted leave from training but in cases of most urgent necessity. Officers of the Train are to be called out for exercise with their train divisions in May. Officers of Engineer Reserves are to train for fourteen days with their depôts in Klosterneuburg and Vienna. Each corps and division artillery regiment calls out 166 men; mountain batteries 101 men each.

A long-distance ride from Vienna to Buda-Pesth is in contemplation. The route is by Fischamand, Hamburg, Presburg, Raab, and Gran. The distance, about 260 kilometres (about 161½ miles), will be travelled, it is hoped, in twenty-four hours.—*Militär-Wochenblatt.*

**BELGIUM.**—*The Belgian Manœuvres.*—The 3rd and 4th Infantry Divisions are to manœuvre this year in the middle of August in the neighbourhood of the Beverloo Camp. The 3rd Division is to have an attached brigade in addition to its own two brigades of two regiments, a battalion of the carabineer regiment, and twelve horse artillery batteries (four guns each). The 4th Division also is to have another brigade attached (two regiments of riflemen), one battalion of carabineers, and eight horse artillery batteries. A cavalry regiment of five squadrons is to be attached to each division. A company of field engineers and the auxiliary services will be added. The divisions assemble on the 18th August, work in brigade and division till the 23rd, and on the 5th September the manœuvres close. Two cavalry divisions assemble in Beverloo on the 15th July till 3rd August. On 23rd each has two horse artillery batteries attached for combined work. The fortress artillery and engineers carry on field operations from 24th August till 5th September at Antwerp, and the arming of the forts in the first line, and at Liège and Namur practice in mobilisation will be carried out. A certain number of Reservists will be called out for them.—*Militär-Wochenblatt.*

**FRANCE.**—During the present year, General Staff journeys will be undertaken in the military government of Paris, and in the 4th, 5th, 7th, 8th, 11th, and 18th Districts. There will be special General Staff journeys in the 14th and 15th Districts, for which the orders have yet to be issued.

In all army-corps, with the exception of the 6th, 14th and 15th, three manœuvres will be carried out with skeleton divisions, under the orders of the respective corps commanders, the divisions being either two active and one reserve, or one active and two reserve.

In the 6th Army-Corps, there will be a fortress manœuvre with a specially composed cadre, two manœuvres, with skeleton divisions (the 41st Division and Reserve Division), and a skeleton brigade manœuvre (the 83rd Brigade).

The 14th and 15th Army-Corps will hold two manœuvres with skeleton divisions, one active and one reserve.

The Lyons District Infantry Brigade will carry out a brigade manœuvre.

The commanding generals were to report by the 15th March which reserve divisions they had decided to call out for skeleton manœuvres, and whether they purpose to hold skeleton manœuvres of their army-corps.

Each of the three Algerian divisions, as well as the garrison division of Tunis, will, under the orders of their own generals, carry out one divisional or two brigade skeleton manœuvres.

Among the seven cavalry divisions, there will be one divisional skeleton manœuvre.

The autumn manœuvres of the French Army have been projected on a much smaller scale in the present year than they were in 1894 and 1895. In those years four complete army-corps were ordered to take part in them, whereas now not more than half of that force will be called upon. The army manœuvres will last for twelve or fourteen days. The territorial regiment, and territorial Jäger battalions, which will be called out for training this year in October, will, on the conclusion of their drill period, hold a two days' manœuvre in the neighbourhood of their own garrisons.—*Deutsche Heeres-Zeitung.*

A most interesting and important step in advance has been taken in connection with military cycling. Captain Gérard, of the 87th Infantry Regiment, at St. Quentin, as is well known, recently invented a portable cycle (*bicyclette pliante*), which enables its rider to unite in his own person the speed of the horseman, and more than his lasting power, with the facility of the infantryman in fighting over any kind of country. On good roads or hard ground the wheel carries the soldier, while on difficult ground the soldier carries the wheel. This folding

machine did splendid service in its experimental stage between St. Quentin and Ham at the last great garrison operations. Twenty-two men of the 87th Infantry were supplied with it for trial purposes, and each of them traversed a distance of more than 1,200 miles, folding up and again starting the cycle 300 times without a hitch. A further advance has been made by the manufacturer of this machine. He has coupled two such cycles together, forming a four-wheeled carriage, under the name of the "Military Sociable," and enumerates among its advantages that it can be used for transport and for removing the wounded; that it will greatly save the horses of an army; economise space and labour; and can be driven by comparatively unskilled hands.—*Revue du Cercle Militaire*.

GERMANY.—Complaints are often made in the English Army of the constant issue of new drill regulations, the authorities being accused of a restless desire for change, and reference has been made to the German Infantry Drill of 1888 as being considered all-sufficient by these scientific soldiers for the requirements of the day. An article in the *Militär-Wochenblatt* of the 22nd ult. shows that the German infantry officer is by no means satisfied that this is quite what it should be. The writer allows that a "normal" attack formation is inadvisable, and admits that the general principles as regards extent of front, general distribution of the troops, the deployment, the opening of fire, how to obtain superiority of fire, etc., are laid down with sufficient clearness to ensure uniformity of training of the German infantry as will enable them to act well together in battle. This, in his opinion, is all very well as regards the preparatory stages of the attack, but further directions are required for the decisive attack, which, according to their Drill Book, is to follow when the preparatory fire has sufficiently shaken the defenders, and the assaulting force has arrived at the point of decisive fire (*hauptfeuerstation*). With modern weapons, he says, this will be in the open no nearer than 600 metres. "Hark forward" is now the word, says the Drill Book. But, asks the writer, is this final advance to be made firing or not? Is it to be in quick time or at a run? The book says no further scheme of attack is now possible. Consequently, some corps advance in quick time without firing the last 400 metres. In others, firing is carried on till quite close to the position. In others, again, the advance is covered by the fire of a very large proportion of the attacking force from a "flank fire position." He points out that the danger in this lies in the impossibility of that simultaneous attack which experience shows to be so necessary to success, and demands that the general principles of the close attack should be laid down by authority like those of the preparatory action. As every well-chosen position will have a certain clear space in front of it which must be got over somehow, and, as a rapid advance for 600 yards is impossible, he advises that a regular uninterrupted advance by short rushes of one position covered by the fire of another, till within 200 to 100 yards of the position, should be officially ordered and practised by all corps alike. It is true, says the writer, that such an attack is permitted by the Drill Book (Part II., p. 82), but it also permits the practising of the attack on other principles, and he believes there is a general wish in the German infantry that these principles for the close attack should be laid down and adhered to by all, without degenerating into a normal attack.—*Militär-Wochenblatt*.

It has been decided by the authorities that the following classes of young men will, in future, be exempt from military service:—*a.* Those who have specially distinguished themselves in any department of science or art, or other meritorious employment; *b.* Scientific experts or mechanicians who hold prominent places in their respective callings; and, *c.* Members of the theatrical profession engaged at the royal theatres. The Prussian War Minister and Minister of the Interior have decided, also, that consideration will be extended to young men who, in preparing for their future work, are

distinguishing themselves at schools of science or scientific institutions, but no school distinctions will avail those who have actually entered on employment. The latter class must be specially eminent in their own line of work.

Great preparations were made in the course of last year for supplying reserves of small arms, including rifles, carbines, revolvers, and cavalry pistols, together with their respective ammunition. During the present year, an instalment of money will be required for 10,023 repeating rifles, 23,250 extra corps repeating rifles, and 5,000 revolvers, but the contracts for the supply of these weapons have not yet been entered into, as a new and lighter pattern of small arm has been brought forward by the Technical Military Committee. The calibre of 8 millimetres will be retained, but the weight of the new rifle will be about 2½ lbs. less than that of any previous arm of the same calibre. An issue of 150 was made in November, 1895, for trial by the troops, and the experiments were all so successful that substantial progress is expected to be made with the production of the improved weapon during this year. It is said that a million-and-a-half would be required to arm the entire Force.—*Militär-Zeitung*.

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ITALY.—The War Minister of Signor Rudini's new Cabinet, General Ricotti, was always against the formation of the 11th and 12th Army-Corps, and wished rather to raise the other corps to a respectable war strength and efficiency without undue strain on the finances of the kingdom. This programme for the present is as follows:—

1. The existing twenty-four regiments of field artillery (192 batteries of six guns) to be reformed into twelve regiments of field artillery (144 batteries of eight guns).

This would economise without reducing the number of guns.

2. Abolition of the 6th squadron of the 24th cavalry regiments.
3. Disbandment of the 4th companies of an infantry and Bersaglieri battalions when on a peace footing.

The Government programme as regards Erythrea is an elastic one. It says that the final object of the operations must be an honourable peace with Menelik; but the troops must not be withdrawn or reinforcements cease to be sent there, until the safety of the army and the dignity of the kingdom is assured. The sphere of the Italian operations is to be limited to the country held before the Treaty of Unalli, and no attempt made to establish a Protectorate in Abyssinia or to conquer fresh country. 140,000,000 lire have been voted for war expenses.

The schools of artillery will be open, as in previous years, from the end of April to the end of September. Horse, field, and mountain batteries are allowed some five or six hundred rounds per battery, consisting principally of diaphragm shrapnel. The companies of fortress and coast artillery, although firing projectiles of all calibres, are to be specially served out with 1,000 ball cartridges for the two-barrel mitrailleuse. The cartridges used will contain nearly one part of filite to three of black powder.—*Revue du Cercle Militaire*.

The "Summer Manœuvres," as they are rightly named in Italy, will, from motives of economy, be held this year on a smaller scale. There will only be the ordinary field manœuvres, cavalry drills, and the larger operations in cadres, terminating with two manœuvres-journeys, one by the cavalry and the other by the general staff.

The field manœuvres will take place in August, except in the case of the Sardinian Army Corps, which, for sanitary reasons, takes the field in the latter half of May. The corps commanders have represented to the War Minister the desirability of continuing the operations for a full month. Marching and night-fighting are to be practised.

Siege operations will be carried on by the 1st Corps at Turin, the 6th at Bologna, and the 9th at Rome.—*Deutsche Heeres-Zeitung*.



RUSSIA.—Much attention is now being paid in Russia to snowshoe drill. Not only are all Volunteer corps trained in this, but also the "skirmishers" (selected men) of certain regiments of the Guard. Race meetings are held, and lately at that of the 148th Regiment a distance of eight versts (more than five-and-a-quarter miles) was accomplished in an hour by the Volunteer battalion.—*Invalides Russe*.

UNITED STATES.—Papier-maché bullets are to be used for blank cartridges. The Ordnance Department has had great difficulty in securing a blank cartridge which would operate in the magazine of the new Krag-Jorgensen rifle. Experiments have been in progress for some time past in connection with this matter. It was found that with the ordinary blank cartridge, the magazine would not operate; that it was necessary to obtain something of the form of the bullet so as to get the magazine to work properly. The first plan contemplated the manufacture of cartridges with copper shells, but they were found to be too expensive. Papier-maché was finally hit upon as the best material to use, and bullets of this material, hollow, have been fired with excellent results. When the explosion occurs, the papier-maché is blown into fragments to a distance of from 15 to 20 yards. A supply of the papier-maché blank cartridges will shortly be issued to the Service.—*United States Army and Navy Journal*.

#### NAVAL AND MILITARY CALENDAR.

APRIL, 1896.

- 1st (W). 1st Life Guards moved from London to Windsor; 2nd Life Guards, Windsor to Albany Street Barracks, London; Royal Horse Guards, Albany Street to Knightsbridge Barracks.
- " " Telegraph wire between Korosko and Murad Wells cut by Dervishes.
- 2nd (Th). H.M.S. "Hyacinth" paid off at Plymouth.
- " " 1st Battalion North Staffordshire Regiment arrived Wady Halfa.
- " " Italians successful in an engagement with Dervishes at Mocran, near Kassala.
- 5th (S). H.M.S. "Collingwood" recommissioned at Malta.
- 7th (Tu). Patrol, under Hon. M. R. Gifford, engaged with Matabeles at Von-seccas, twenty miles North of Buluwayo; three British killed and seven wounded including Gifford.
- 10th (F). H.M.S. "Caroline" paid off at Sheerness.
- " " Patrol, under Captain Brand, engaged with Matabeles thirty-six miles South of Buluwayo.
- 11th (Sat.) Wire between Suakin and Tokar cut by Dervishes.
- " " Engagement between Osman Digna and friendly Sheikh Omar Tita.
- 14th (Tu). Launch of first-class armoured-cruiser "Esmeralda," for Chilean Government, from the Elswick ship-yard.
- 15th (W). Column, under Lieut.-Colonel G. E. Lloyd, D.S.O., left Suakin to support friendly Arabs at Horasab; in co-operation with small force from Tokar, under Major H. M. Sidney. Cavalry squadron of former, while reconnoitring, under Captain M. Fenwick, came in contact with Dervishes in considerable numbers, but returned in safety next morning.
- 16th (Th). Launch of H.M. 30-knot torpedo-boat destroyer "Fame" from Messrs. Thornycroft's yard at Chiswick.

- 16th (Th.) Launch of torpedo gun-boat "Almirante Simpson," for Chilian Government, from Messrs. Laird's works at Birkenhead.
- 18th (Sat.) Major-General Sir F. Carrington, Commanding Infantry Brigade, Gibraltar, ordered to assume command of operations in Matabeleland.
- 19th (S.) Several small encounters outside Buluwayo.
- 20th (M.) Party from Buluwayo, under Captain Macfarlane, engaged with rebels on Umgusa River. Unsuccessful attempt of Captain Napier to engage the enemy.
- 22nd (W.) Action fought with Matabeles on Umgusa River; one killed on British side, and three officers and one man wounded.
- 25th (Sat.) 1st Battalion Middlesex Regiment, under Major J. G. White, and Highland Company of Mounted Infantry Regiment, under Captain G. R. Tod, Seaforth Highlanders, left Aldershot for South Africa.
- " " Sharp and successful engagement on Umgusa River, four miles North of Buluwayo; four British killed, one officer and two men wounded.
- 27th (M.) Launch of first-class battle-ship "Bouvet" at Lorient, for French Government.
- " " Launch of coast-defence battle-ship "Buda-Pest" at Trieste, for Austrian Navy.
- 28th (Tu.) Launch of first-class battle-ship "Hannibal" at Pembroke.
- " " H.M.S. "Intrepid" commissioned at Portsmouth.
- " " Launch of third-class cruiser "Galilée" at Rochefort for French Government.
- " " 1st Life Guards moved from Windsor to Pirbright; 1st Battalion Grenadier Guards, Wellington Barracks to Pirbright; 2nd Battalion Grenadier Guards, Chelsea Barracks to Windsor; 2nd Battalion Coldstream Guards, Chelsea to Wellington Barracks; 1st Battalion Scots Guards, Windsor to Pirbright.

## FOREIGN PERIODICALS.

## NAVAL.

ARGENTINE REPUBLIC.—*Boletín del Centro Naval*. Buenos-Aires: February and March, 1896.—“The Training Squadron.” “Belleville Boilers” (*continued*). “On the Use of Steel for Guns.” “Artillery Trials” (with photographs of plates).

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens*. Pola and Vienna: May, 1896.—“On the Influence of the Adriatic upon the Nations of Central Europe.” “A New Compass.” “On the Water-Circulation in Water-Tube Boilers” (with plans). “Foreign Navies in 1895.” “The New English Torpedo-boat-Destroyer ‘Desperate’” (with plans). “The English Naval Estimates for 1896.” “Naval Foreign Notes.” “Notices of Books.”

DENMARK.—*Tidskrift for Søvæsen*. No. 2. Copenhagen, 1896.—“The Heavy Armaments of English Battle-ships since the introduction of Breech-loading Ordnance.”

FRANCE.—*Revue Maritime*. Paris: March, 1896.—“The Upper Mekong.” “A Method of Indicating and Registering Distance from the Revolutions of the Engines.” “Notes on an Instrument intended to facilitate the Solutions of the Problems of the Choice of Courses to be Steered in Chasing, etc., by Squadron-Cruisers.” “Scientific Cruise of the ‘Caudan’ in the Gulf of Gascony.” “Influence of Sea-Power on History, 1660-1783” (*continued*). “Seamen’s Maladies and Naval Epidemics” (*continued*). “Foreign Naval Chronicle.” “The Maritime Fisheries.” April, 1896.—“Madagascar: Nossi-Be and the Commerce of the South-West Coast.” “The New Torpilleur-de-haute-mer ‘Lansquenet.’” “The Influence of Sea-Power upon History, 1660-1783” (*continued*). “The Late Rear-Admiral Fleuriat: a Notice of his Life.” “The New Harbour Alexander III. at Libau.” “The English Channel Squadron.” “Foreign Naval Chronicle.” “The Maritime Fisheries.”

*Le Yacht*. Paris: 4th April, 1896.—“A *propos* of the Egyptian Question.” “Yachting Notes and News” (with photographs). “Maritime Technical Association, Discussion:—The Complication of Ships-of-War, its Causes and Remedies.” “Naval Notes, Home and Foreign.” 11th April.—“The Superior School for the Navy.” “Yachting Notes and News” (with photographs). “The New U.S. Ram ‘Katahdin’” (with photograph). “The Effects of Fire from Ships upon Fortifications.” “Naval Notes, Home and Foreign.” 18th April.—“The Re-organisation of the Central Administration.” “Yachting Notes and News” (with photographs). “Naval Notes, Home and Foreign.” 25th April.—“The Proposed Marine Budget for 1897.” “Yachting Notes and News” (with photographs). “The Administration of the Merchant Marine.” “Naval Notes, Home and Foreign.”

*Le Moniteur de la Flotte*. Paris: 4th April, 1896.—“The Necessary Effort” (*continued*). “Naval Notes, Home and Foreign.” 11th April.—“Sound Signals at Sea.” “Re-organisation of the Central Administration.” “Naval Notes, Home and Foreign.” 18th April.—“Submarine-Boats.” “The Naval Budget for 1897.” “The Surveying Mission to the Mekong.” “The Re-organisation of the Central Administration.” “The Administration of the Inscription Maritime.” “Naval Notes, Home and Foreign.” 25th April.—“Submarine Boats” (*continued*). “The Superior Council of the Mercantile Marine.” “Naval Notes, Home and Foreign.”

*La Marine Française.* Paris: 10th April, 1896.—“The Crisis in Foreign Politics and the Navy.” “The Defence of the Coasts.” “The New United States Navy.” “Some General Considerations on Ships of the ‘Jemmapes’ type.” “Naval Notes, Home and Foreign.” 25th April.—“The Seine and National Defence” (with plans). “The Naval Bases of Operations of the English Fleet.” “The New United States Navy” (*concluded*). “Naval Notes, Home and Foreign.”

GERMANY.—*Marine Rundschau.* Berlin: May, 1896.—“The Gun-boats of 1859” (with sketch). “A New Method of Working the Reckoning” (with seven plans). “Trials of the Fourth-class Cruiser ‘Geier.’” “The Russian Volunteer Fleet.” “The Battle of Trafalgar, from a Spanish source.” “Foreign Naval Notes.” “Notices of Books.”

ITALY.—*Rivista Marittima.* Rome: April, 1896.—“Mixed Boilers, Marine and Water Tube” (with plates), by N. Soliani. “Yachting” (*continued*), by A. Camurri. “Submarine Telegraph Cables in War-Time” (with plates), by P. Orsini. “The Commerce of Italy for 1895,” by A. Teso. “Naval Notes:—Chili: Launch of the torpedo-boat destroyer ‘Capitan Muniz Gamero’; France: Trials of the coast-defence-ship ‘Amiral-Tréhouart,’ the battle-ship ‘Jauréguiberry,’ and of the cruisers ‘Bugeaud’ and ‘Cassini,’ Design for sub-marine torpedo-boat submitted for public competition, Sale of the ‘Marengo’; Japan: Launch of ‘Yashima,’ with description of the vessel; England: The Budget 1896-7, New Constructions, Temperley Coaling Apparatus, etc., etc.; Italy: Trials of the protected-cruiser ‘Marco Polo’ (with photographs); Russia: Transport of torpedo-boat by rail.” “Mercantile Marine:—Trials of the Italian mail-boat ‘Cristoforo Colombo’; Navigation of the Suez Canal, 1895; Sanitary Regulations, Italian Marine.” “Notices of Books,” etc. “Supplement:—On the Naval Organisation of the Powerful European Nations—Germany.”

*L'Osservatore Navale.* Palermo: April, 1896.—“Composition of Squadrons,” etc., by G. Pennino. “Hydraulic Action on the Coast-Line” (*continued*), by G. Olivari. “Determination of the Direction of the Wind at Sea,” by T. A. Rafanelli. “Provisions in favour of the Mercantile Marine,” by N. Gilberto. “Naval Notes.” “Notices of Books,” etc.

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## MILITARY.

AUSTRIA-HUNGARY.—*Militär-Zeitung.* Vienna: 5th April, 1896.—“The Increase of Pay.” “The Landsturm Musketry School of the Vienna Shooting Club.” “The Position of Military Pensioners.” 13th April.—“For Widows and Orphans.” “The English and German Navies.” 21st April.—“Unfavourable Currents.” “The German Kaiser and Kaiserin in Vienna.” “The New Coast-defence Battle-ship ‘Buda-Pest.’” 29th April.—“The Advantage of the Supply

of Uniforms by the Government as in the Army, compared with a Money Allowance in lieu as in the Navy." "The Austro-Hungarian Army and Navy at the Hungarian Millennium Festival." "Launch of the Coast-defence Battleship 'Buda-Pest.'"

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FRANCE.—*Revue de Cavalerie.* Paris: March, 1896.—"From Lützen to Bautzen, May, 1813." "Nouveau jeu" (ideas on the training of cavalry recruits). "Trots and Gallops"; chat on cavalry questions, the *morals* of the trooper. "The last manœuvres in Hungary."

*Le Spectateur Militaire.* Paris: 15th April, 1896.—"Artillery in action," by Colonel Chabert. "The Organisation of the Higher Commands," by Noel Desmaisons. "Retirement and Guarantees," by L. X. "Decorations, Crosses and Medals" (*continued*), by C. Boissonnet. 1st May.—"Infantry Shields," by Léonce Brun. "Studies in Applied Tactics," by Pierre Lehautcourt. "The Organisation of the Higher Commands" (*concluded*), by Noel Desmaisons. "Decorations, Crosses and Medals" (*continued*), by C. Boissonnet. "An Account of the Military Pictures," by Marétheux.

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*Jahrbücher für die deutsche Armee und Marine.* No. 4. Berlin: April, 1896.—"On the Genesis of the History of the Thirty Years' War." "The Battles of the German Army on their Forward March in August, 1870" (continued). "Friedrich von Hellwig: a study of Partisan Warfare in 1814" (concluded). "Memorial Notes on the Officers and Officer-Aspirants of the German Cavalry who were killed or died during the War of 1870" (concluded). "Military Life in the Thirty Years' War." "The Assembling of the Great Army of the Loire at Lehautcourt." "Military Notes." "Notices of Books."

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SPAIN.—*Memorial de Ingenieros del Ejército*, No. 2. Madrid: February, 1896.—“Chemical Composition of Steel.” “Wooden Sleepers” (*concluded*). “An Opinion on Military Matters in Germany.” “Military Notes.” “The Problems of Ballistics as Applied to Fortification and Tactics.” “Notices of Books.” No. 3. March, 1896.—“Chemical Composition of Steel” (*concluded*). “Some General Observations on Filters.” “The Use of Our Network of Railways in War.” “The Anderson Method of Drilling Armour Plates.” “Destruction of a Railway Bridge by Dynamite in the Cuban Campaign.” “The Army and Fleet of the United States.” “Military Notes.” “The Problems of Ballistics as Applied to Fortifications and Tactics” (*concluded*). “Notices of Books.”

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## NOTICES OF BOOKS.

*Fire and Sword in the Soudan: a Personal Narrative of Fighting and Serving the Dervishes, 1870-95.* By RUDOLF C. SLATIN Pasha, C.B. Translated by Major F. R. WINGATE, C.B., D.S.O., R.A. London: Edward Arnold, 1896.

Fifteen years ago commenced that retrograde movement which has thrown the Soudan back from a state of growing, if somewhat crude, civilisation, to a condition that approaches close to, if it does not actually reach, barbarism. In 1881 the Soudan was under a civilised Government, though, unfortunately, that Government was, in many cases, administered by corrupt and avaricious officials. At Khartoum, the centre of Government, the great nations had their consular representatives. Trade flourished, and in the chief towns commercial firms—European as well as Egyptian—had places of business. Communications with the outer world were maintained through the medium of an organised postal and telegraph service, and that pioneer of civilisation, the steamboat, ploughed the muddy waters of the Nile. To-day the fiercest, most ignorant, most fanatical, and most barbarous of the many tribes which compose the Soudan population have, as far as in their power lies, shattered this nascent civilisation, and have in lieu of it established a Government "from which they have eradicated almost every symbol of right, justice, and morality," and substituted in its lieu a *régime* of "injustice, ruthless barbarity, and immorality." The Soudan is the hub of that vast Africa which lies inside of that line within the coast which marks the extent to which European civilisation has as yet touched the dark Continent. The Mahdist movement must, therefore, necessarily constitute an important era in the history of the emergence of Africa from a state of barbarism—a barbarism so primitive and absolute that scarce elsewhere in the world can its parallel to-day be found. It is sufficient to say that Slatin Pasha's book is the history of this period to demonstrate its importance. It is not necessary here to follow in detail the genesis and growth of the Mahdist movement. This our readers can do for themselves in Slatin's pages, and in so doing they will probably conclude that now, if ever, the time has come, not only for Egypt to reap substantial benefit in again opening up to trade a country which only needs settled Government to enable it to produce vast wealth, but to crush the fanatical barbarism that has upset the foundations on which the civilisation of central Africa has been slowly rising for close on a century. That the Khalifa's Empire is distinctly on the wane, and at this particular moment so poised on a downward grade that but little effort will be required to hurl it to its downfall, can best be proved from Slatin's own words.

"On the East Egyptian influence is slowly—very slowly—recovering its lost ground in the vicinity of Suakim and Tokar. To the South-East the Italians have captured Kassala, and have forced the Mahdists to take up a strong line of defence on the West bank of the Atbara river. Further South the Abyssinians show no present intention of altering the relations which have previously existed between them and the Dervishes. In the mountainous districts of Fazoglu and the Blue Nile the inhabitants have thrown off allegiance to the Khalifa. Far away to the South, at the sources of the Nile, British influence is beginning to make itself felt in those regions . . . which will ere long be connected with the Coast by a railway which will open up not only the country it traverses, but will also give an exit to the trade of Southern Equatoria and the adjacent countries. Next to these British possessions comes the Congo Free State, which within the

last few years has made such gigantic strides in bringing under its influence large tracts of country, not only in the vicinity of Mbomu and Ubangi, but in many districts of the Bahr el Ghazal Province and in Equatoria, almost to within striking distance of the Dervish advanced post at Reggaf in the Nile valley, while behind them, in the Haute Ubangi, or even in juxtaposition with them, the enterprising French pioneers are striving to give effect to their colonial dreams, which have of late years been so fully realised in various parts of Africa. Still further to the North-West the Khalifa's authority in those districts is menaced by hostile tribesmen who may, sooner or later, become subject to the guidance of European influence penetrating from the West and North of Africa; and on the extreme North lies the Egyptian Power, which Abdullahi is gradually learning to dread, as being that most likely to interfere with the uncertain tenure of his Empire."

This, then, is the the outside pressure that environs the Empire of the Abdullahi bin Sayd Mohammed, Khalifa el Mahdi, and even if such an Empire were a stable one, based on the love and courage of loyal and contented subjects, it would even then only be in a condition to defend, with a possible probability of success, a difficult defensive position. But such is far from being the case. Slatin conclusively demonstrates that the Khalifa's Empire is rotten to the core. The depression in trade amounts almost to a non-existence, and "the once extensive commerce of the Soudan has now sunk down to comparatively nothing; and the roads which were formerly traversed by numberless caravans are now deserted, obliterated by sand, or overgrown with rank vegetation." Iniquitous taxation has crushed commercial enterprise. "The tax of *ushr* (a tenth), is levied on all goods imported to the Soudan. It must be paid in either money or kind, and is frequently taken more than once along the road. All goods on arrival at Omdurman are taken to the Beit el Mal and stamped; and here the *ushr* is again taken. Merchants, therefore, owing to the heavy taxes imposed, in addition to the presents they have to make to the various chiefs, have generally paid half as much again over and above the value of their goods. They are, therefore, obliged to considerably raise the price; and even then the total profit is by no means a large one." In fact, trading with Egypt is undertaken by many not so much with a view to the gaining of wealth as to the gaining of a few months in the year of respite from the tyrannical rule under which the country groans. The depreciation of the coinage again offers an interesting indication of the decline of the Khalifa's power. The first Mahdi dollar coined was composed of seven parts silver and one copper. To-day the "dollar of Omla Gedida," the last coined by the Mahdi, is composed of five parts copper to two of silver; a fact in no way to be wondered at when we learn that the mint is farmed to two individuals who pay \$6,000 a month each for the privilege of coining, and whose issue must be accepted by merchants under penalty of "wholesale confiscation of their property, accompanied by flogging and imprisonment." The natural consequence is, the prices of imported articles have risen enormously, whilst "local produce, such as grain and cattle, has proportionately diminished in value." One trade, however, still thrives, and that is the slave trade, though this also is declining as the sources of supply become exhausted by war, disease, and famine. "The majority of the slave-producing districts, such as Darfur, have become depopulated, or, in some cases, the tribes, such as the Tama, Massalit, etc., have thrown off allegiance to the Khalifa. Consignments, however, still come from Reggaf; but, owing to the long and tedious journey, numbers of them perish on the way." Moreover, diseases of the foulest and most virulent character are chronic, whilst famine is epidemic throughout the whole of the territory which owns the tyrant's sway. Of justice or law there is practically none. The kadis, or judges, are the most subservient of tools in their master's hands, and, as their salary is only from twenty to forty Dervish dollars per month, it is scarcely to be wondered at "that venality enters largely into the minor judgments with which the Khalifa does not interfere," and the fact that they can refuse or accept witnesses at will also affords them

opportunities of increasing their income. "The kadi of the Mulazemin has special instructions that any case between one of the body-guard and natives of the country—even if they be the highest in the land—shall invariably be given in favour of the former; and so rigorously is this law enforced, that it is now never thought worth while to enter into a lawsuit with one of the body-guard." The merciless severity with which revolt is crushed is well illustrated by Slatin's account of the treatment meted out to those of the Batahin tribe who refused to obey the Khalifa's orders to proceed to Dongola. Sixty-seven prisoners with their women and children were brought in. Torn from the embraces of the latter, who clung to them crying and screaming, they were divided into three batches, one of which was hanged, a second decapitated, and the third had the right hand and left foot amputated. The Khalifa then turned to Osman Wad Mahomed, one of the kadis, and himself a Batahin, and said, pointing to the mutilated wretches, "You may now take what remains of your tribe home with you." In short, in Slatin's own words, "75 per cent. of the population has succumbed to war, famine, and disease, while of the remainder the majority are little better than slaves. . . . Prosperous districts with a teeming population have been reduced to desert wastes. The great plains over which the Western Arabs roamed are deserted, and their places taken by wild animals, while the homesteads of the Nile dwellers are now occupied by those nomad tribes who have driven out the rightful owners of the soil or enslaved them to till the land for the benefit of their new masters." Slatin's years of misery and privation have not been utterly thrown away, if they succeed in convincing us that now, if ever, it is in our power to step in and rescue a country which many consider is and must be an integral part of that Egypt whose destinies England is now controlling. To those who so think, the path of duty is a clearly marked-out one for this country, and any hesitation or faltering in the way would, they think, cause us to deservedly lose that place in the van of the world's progress which we now hold in virtue of the fact that,

"Where the footfall sounds of England, where the smile of England shines,  
Rings the tread and laughs the face of freedom, fair as hope divines  
Days to be, more brave than ours, and lit by lordlier stars for signs."

Until the gallant Pasha at last emerged from his long captivity, such full and authentic information as to actual facts was not at our disposal as is now before us; and, curiously enough, coincident with his return to civilisation, a determined effort seems to have commenced to restore the Soudan to that civilisation from which it has fallen. This looks as if his revelation of the true conditions prevailing has influenced those in authority, for not only has no forward movement been heretofore contemplated, but such has been absolutely vetoed; for it is asserted on good authority that only as recently as last winter Lord Cromer peremptorily refused the repeated requests of the military authorities to be allowed to break up a Dervish band that had concentrated near the Egyptian frontier. Slatin's influence may have done this, and if so the perusal of his book will satisfy the public that the authorities have been right in allowing themselves to be governed by his influence. Apart from the literary merit of the work, which is of a distinctly high character, we can earnestly recommend its perusal to our readers, for it is the history of a period which is not only pregnant with the future of the African Continent, but the outcome of which must vitally affect the future of the British Empire. Moreover, it is a history written by, probably, the only man alive fully competent to best perform the task he has undertaken.

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*Historische Legionen Habsburgs.* Von OSKAR TEUBER. Mit 16 Original-Abbildungen von Rudolf von Ottenfeld. Prague and Vienna: F. Tempsky; Leipzig: G. Freytag. Price 10 marks.

Now that the individuality of many of the famous Legions of the House of Habsburg has become lost, or at any rate greatly obscured, by re-organisations

and new formations, and especially now that the imperious necessities of short and compulsory service have made it incumbent to pass young soldiers through the ranks as quickly as possible, there is some danger lest *esprit de corps* and regimental tradition should lose their hold over the minds of young soldiers who no longer have the same opportunities of becoming instilled with those precepts which in the old days were considered as almost forming the religion of the ranks. Herr Oskar Teuber, like many another soldier, is a staunch upholder of Regimental Tradition, and keenly regrets the loss of those little, and possibly *insignificant*, emblems and tokens which went so far in fostering soldierly pride, *in themselves*, but which now, alas! have been sacrificed to the ruthless modern mania for uniformity. In Austria, the reformer has not been satisfied with merely reducing superfluous vanities, but he has even erased the names of some of the most famous regiments from the Army List.

Under such circumstances the idea of a succinct history of the Habsburg's Legions is a happy inspiration, and its fulfilment will do much to re-knit the bond with the past, which is fast disappearing from the Austro-Hungarian, as well as from other continental, armies. The present work recalls the stirring deeds of some twenty famous regiments who have shed their blood in their country's cause on many a well-fought field. The first chapter is appropriately dedicated to a short history of Dampierres Cuirassiers, now Montecuccoli Dragoon Regiment No. 8, who on the 5th June, 1619, when the capital was menaced by a rebel army 10,000 strong, rode boldly into the Hofburg to the rescue of Kaiser Ferdinand II., who had already fallen into the hands of the insurgents. For this daring exploit the regiment was accorded various privileges by their grateful sovereign. Among the more cherished of these was their prescriptive right to march through the Hofburg with trumpets sounding and banners flying, and that of the Colonel to appear unannounced before the Kaiser. These privileges were again confirmed to the regiment by Kaiser Franz I., on the 200th anniversary of this historical event. The regiment, however, does not base its claims to distinction on dynastic grounds only, for it received plenty of hard blows, which were less generously rewarded, perhaps, in the Napoleonic wars. At Wagram, 5th July, 1809, the regiment lost 11 officers, 187 men, and 281 horses. At Königgrätz, 3rd July, 1866, after remaining for some hours in enforced inactivity, it again had an opportunity of adding to its glorious record by helping to cover the retreat of the Army; on this occasion it suffered a loss of 23 officers, 269 men, and 363 horses killed and wounded; this was equal to a loss of 75 per cent. of officers and 50 per cent of men, and was greater than that of any other cavalry regiment on the field.

In the chapter on the "Kanoniere des Kaisers," Corps Artillery Regiment Kaiser No. 8, we are treated with a humorous description of the inception of Kaiser Maximilian's "Arkelley," showing how that learned artilleryman set out with his two monsters "Wake 'em up" and "Slap-bang" to humble the pride of his recalcitrant vassal Hans Pinzelmann in his fastness of Kufstein. These monsters out of their capacious mouths vomited iron balls which pierced through granite walls 5 metres in thickness, and then expended their superfluous energy in knocking to pieces sundry promiscuous rocks and buildings out of sheer wickedness. But if the Kaiser's "wicked arkelley" was feared by his enemies, it was not too greatly beloved by the troopers and Landsknechte in his own camp. The Kaiser, having a good opinion of his own genius as an inventor, paid his gunners handsomely, and the trooper, who only received a third or a quarter the pay of the gunner, in no way relished the idea of being obliged to venture into the thick of the enemy at the imminent risk of having his skin pricked with his own weapon, whilst his comrade of the Arkelley fired his gun at his ease and lived in clover like a lord. "When the whole army," bitterly writes an old Swiss Landsknecht, "is suffering from hunger, the gunners feast on flesh and poultry," and whilst we have

to put up with ditchwater they revel in wine." In those days the gunner was, so to say, the patrician of the army. He was not only socially a man of substance, but a scholar as well, who could read and write, at a time when many of the officers could do neither; moreover, he was supposed to have the higher mathematics at his finger ends and the devil in his body. There were, however, further grievances against him; the gunner was assured under sign and seal of his share of the booty—all the bells of conquered towns and all war material on the ramparts were his—he was also always with his beloved bride, and could find a soft board in the wagon and enough to eat and drink, whilst the other god-forsaken soldiers were toiling and hungering on foot. Little wonder, then, that the gunner was hated like sin, even in his own service, and that, when captured by the enemy, he was unceremoniously shot back again into his own camp. In time, it is true, this summary proceeding was found to be too reckless an expenditure of costly munition, and the gunner was afforded the opportunity of paying off old scores against his late comrades of the infantry by being pressed into the enemy's ranks. In spite of all jealousies, however, the gunners of the Kaiser waxed fat and rapidly increased; at the same time, also, improvements were being made in artillery material. Under Kaiser Leopold I. the guns could be loaded and fired "as quickly as a small sword can be drawn and put back in its scabbard."

In 1596 the General of Ordnance received the somewhat high-sounding title of "Feld-Land-und-Haus-Zeugmeister"—a title which has since been crystallised into the modern one of "Feldzeugmeister"—and many of the most famous generals—among them Tilly—held this appointment. The prince of gunners was, however, Josef Wenzel Fürst von Liechtenstein, under whose fostering care the Austrian Artillery Corps became famous throughout Europe; in his time the corps was raised from a strength of 1,000 to one of 3,500 men. In spite of the gunner having algebra, geometry, the higher mathematics, and all the exact sciences at his finger ends—formulae were located in the little finger—promotion in the corps was lamentably slow, as is witnessed by an old doggerel, the gist of which is that two soldiers, after tramping through and through the land were still found to be, the one a first lieutenant and the other a lieutenant; they never reached the rank of captain, for both were of the artillery.

The Austrian Artillery has always been famous for its efficiency and valour, but, perhaps, the most glorious epoch in all its history is associated with the disastrous year of 1866; at Königgrätz, the Austrians lost nearly 200 guns, but their loss, as Major Müller says, represented a whole army saved to the state. What more glorious episode could be recorded in the annals of an army than that of the devotion of the "battery of the dead" at Königgrätz? When Captain von der Gröben's battery, alone on the heights of Chlum, opposed the advance of the Crown Prince of Prussia's Guards; with two officers and sixty-eight men lying dead by their guns, Lieutenant Merbel still served the last gun, and not until sufficient time had been given to save the Reserve Artillery, the IIIrd Corps, and Benedek's headquarters, did he bring off his remaining gun after spiking the other 7, mute perforce by the stillness of their servers!

That humour, under depressing circumstances, is not altogether confined to the soldier hailing from the Emerald Isle, one incident may be quoted as having occurred in the Hungarian Campaign of 1849. At the action of Uj-Szöney, a soldier belonging to the Infantry Regiment Hoch-und-Durchmeister No. 4 had his foot carried off by a cannon-ball. In spite of all efforts to remove him to the field hospital, he refused absolutely to be taken without his foot. "*Ja wozu denn?*" "Why do you want it?" asked the surgeon. "*Was wird denn der Herr Hauptmann sagen,*" replied the soldier coolly, "*wenn ich ohne meine neuen Schuhe einrücke?*" "I should like to know what the captain'll say if I turn up with my new boots missing?"

*Attack or Defence: Seven Military Essays.* By Captain MAUDE, *p.s.c.*, late R.E.  
London: J. J. Keliher and Co., 17B, Great George Street, S.W.

Few military libraries are without Captain Maude's "Essays on Tactics and Organisation," and the teaching of that unpretending volume has been found useful by soldiers of all branches of the Service. The present volume, although the title would imply that the scope is narrower, covers much the same ground, and contains further reflections on the most important questions which attract the thought and research of the student of war. The Essays are by no means elementary. They appeal to those who have a knowledge of fundamental principles, who are familiar with the armament of modern armies, and who have an intimate acquaintance with military history. They are addressed to men who have already seriously considered the problems involved, and for such they will provide much food for thought. The Essays are no academic discussion of the relative advantages and disadvantages of attack and defence. The author goes far deeper into the mysteries of war than the title of his work implies. Two main ideas form the basis of his propositions, ideas which are too often disregarded both by theoretical soldiers and by the "man in the street." Captain Maude never loses sight of the fact that not the gun, but the man behind the gun, is the predominant factor in war; nor of the fact that without discipline neither man nor gun is likely to be useful. It need hardly be said that this is the true standpoint from which all tactical questions should be dealt with; and so prominently is it kept to the front in these Essays, that the reader, whether he agree or disagree with the conclusions of the writer, will certainly admit that, based on common-sense as they are, on the phenomena of the battle-field, and on the sensitiveness of human nature, they are well worth consideration. Some of these Essays have already appeared in English periodicals; others, and amongst them the most important and instructive, "Field Fortification and Entrenched Camps," and "The Evolution of Modern Drill Books," saw the light in America. Both of these last are to be strongly recommended. They not only embrace a great number of the questions which agitate the minds of those soldiers who are concerned with the battle-fields of the future, but they form an original and *fin-de-siècle* commentary on the tactics of the Franco-German and Russo-Turkish Wars. Not only do they explode myths which have long disfigured our military literature, and on which most pernicious theories have been erected, but they contain a calm and rational view of the effects of modern fire as compared with the fire of a past era. For this reason, if for no other, they are of great practical value. On a certain class of mind, oppressed by the exaggerated accounts of such episodes as St. Privat and the attack of the 38th Brigade at Vionville, and the assault of the redoubts of Plevna, the attack has impressed itself as a hopeless task, and this idea has been so industriously circulated that the majority of the public have been converted to a false faith in strong earthworks and a multitude of riflemen. Captain Maude's judicial dissection of the episodes which form the foundation of this faith shows that the attack, even of the strongest position, if the troops are properly trained, is not so formidable a business after all, and, also, that the defence of a position, if the troops are not disciplined, is no easier than heretofore. It is to be regretted that Captain Maude has not found space to discuss fully the bearing of strategy on the question of attack or defence. It is in strategy that the key of the problem is concealed, and we may hope that in the near future he will turn his attention to the wider aspect of his subject. It would not be difficult to show that, save under the most forlorn and desperate circumstances, the idea of the defensive is incompatible with sound and vigorous strategy; and a historical review of the strategy of the great captains, a clear exposition of the methods by which they brought about the annihilation of their enemy, would go far to restore a healthy tone to military thought. It may be added that the Essay on the Rise, Decay, and Revival of the Prussian Cavalry is an exceedingly interesting *résumé* of the generation of the ubiquitous Uhlan and of Bredow's Cuirassiers, and, at the same time,



contains much suggestive matter as to the training, and object of the training, of both man and horse.

*Almanach für die K. U. K. Kriegs-Marine, 1896.* Published, with the permission of the Marine Section of the Imperial Ministry for War, by the Hydrographical Department at the Imperial Dockyard at Pola, and under the supervision of the Editor of the "Mittheilungen aus dem Gebiete des Seewesens." 16th year of the new edition. Pola and Vienna : Gerold. Price 4 marks.

Want of space has prevented up to now any notice of the new edition of this valuable little work of reference, which fully maintains the high standard of excellence attained in earlier issues. Although one or two rivals on the same lines have lately appeared, the Almanach still remains the most valuable manual of its kind published in any country. The present volume is somewhat fuller than its predecessors, some additional information being given, a longer chapter being devoted to the Pay and Emoluments of the Officers and Men of the Imperial Navy, and another to the Austrian and Hungarian Mercantile Marine, with a list of the principal merchant steamers and vessels, where trading, etc. As usual, the tables have been brought up to date of the war-ships of every country, which include torpedo-boats, school, gunnery, and training-ships, troop-ships, yachts, and even tugs and vessels for dockyard service, as well as all merchant steamers retained as auxiliary cruisers. There are no fewer than 178 wood-cuts, depicting the profile and deck plans of the principal armoured battle-ships and cruisers of different nations, on which are shown the dispositions and thickness of the armour on belts, batteries, turrets, and armoured decks, as well as the position of the different guns, their calibre and arcs of training, etc. These include the "Majestic" and "Terrible," as well as the latest ships of other countries. The ships are carefully tabulated according to their different classes, with their dimensions, horse-power, estimated speed, coal stowage, thickness and disposition of armour, etc., with description of their guns, whether Armstrong, Krupp, Canet, etc., and in addition ample accompanying notes record any special information attaching to any ship, such as a belt of cellulose, the sponsoning out of guns, and other details. The latter part of the work gives a list of all the officers on the active and reserve lists of the Imperial fleet. There are 454 pages of matter in the book, which is at the same time of so convenient a size that it can be comfortably carried in a breast pocket, while the print is clear and of a perfectly readable type. It only costs four shillings, and although in German, yet it is well worth the while of naval officers who are ignorant of that language to procure it, as the diagrams of the ships are quite worth the money alone, and require no explanation, the thickness of armour-plates being given in millimetres and the calibre of the guns in centimetres.

*Taktische Entschlüsse und Befehle (Tactical Decisions and Orders).* By A. BUDDECKE, Captain 143rd Regiment. (Paper cover  $9\frac{3}{4}'' \times 6\frac{1}{2}'' \times \frac{3}{4}''$ ; weight about 14 ozs.)

A brief notice of this work, published by Mittler and Sons last year, appeared in No. 209 of the JOURNAL (July, 1895). It is one of the most useful books on applied tactics that have recently appeared. The writer in his excellent introduction lays stress on the method to be pursued, if success is to follow tactical study. He urges the necessity of the student being impregnated with the regulation drill books of the three arms, as well as with the "Regulations for Field Service" (an official guide to war much wanted in our own Service), so that the principles inculcated therein may intuitively pass through the mind when the solution of any tactical question is approached, "as the hand of a skilled workman instinctively grasps, without looking for it, the tool required to carry on his work." For, as



he justly observes, without this the solution of tactical problems is sure to be hampered by technical difficulties.

English officers will do well to bear this in mind, for many think that "applied tactics" can be learnt, if their wits are sharp enough, without a close study of their drill books. This is a fallacy. This interesting study gives a complete, though brief, account, of the operations of an independent infantry division in pursuit of a hostile force in North-East Prussia, the operations lasting a week. The general and special ideas were set at the Berlin Kriegs-Akademie (Staff College), and the solutions have been very thoroughly worked out by the author.

There is, as far as we know, nothing of quite similar character published in English, except that excellent work "Staff Duties in the Field," by Lieut.-Colonel Y. M. Grierson, R.A., Military Attaché at Berlin, published by the Department of the Director-General of Intelligence of the English War Office. But the latter most valuable book deals with the operations of an army-corps, and concerns itself much with strategy, with the arrangements for supply, etc., and with staff duties in detail. The book under review, while by no means neglecting these most essential points, deals with the tactical situations as they occur day by day of a smaller force.

It discusses the method of thought by which a correct solution of tactical questions may be arrived at, gives the chief points by which a good solution may be recognised, and then proceeds to show how these may be applied to the situation in each case. It gives concisely, but in detail, the reasons for the success in decisions arrived at, and it especially goes into "*the Framing of Orders in the Field*," to which the Germans rightly attach much importance; a matter ably dealt with by Lieut.-Colonel Henderson, Professor of Military Art of the English Staff College, in a recent lecture in the R.U.S. Institution. It has been thought, therefore, opportune to again notice more fully this book, as Captain Buddecke discusses thoroughly the question of orders, gives headings for orders of all kinds, and several examples of orders for advanced guards, outposts, attack, pursuit, bivouacs etc., which the operations he describes necessitated. He gives brief calculations of time and space and of lengths of columns, etc., worked out before the orders were issued, and sums up shortly, but adequately, the reasons for the orders given.

The subject of reports is well gone into, and several examples are given. Altogether, it is just such a work as is required for the practical study of their profession by British officers, as it follows the method instinctively adopted by successful commanders in war, and should be invaluable to officers studying for tactical examinations, as it emphasises those points which examiners and others have given prominence to in their reports on recent examinations. For these reasons we are glad to hear that the work is being translated into English.

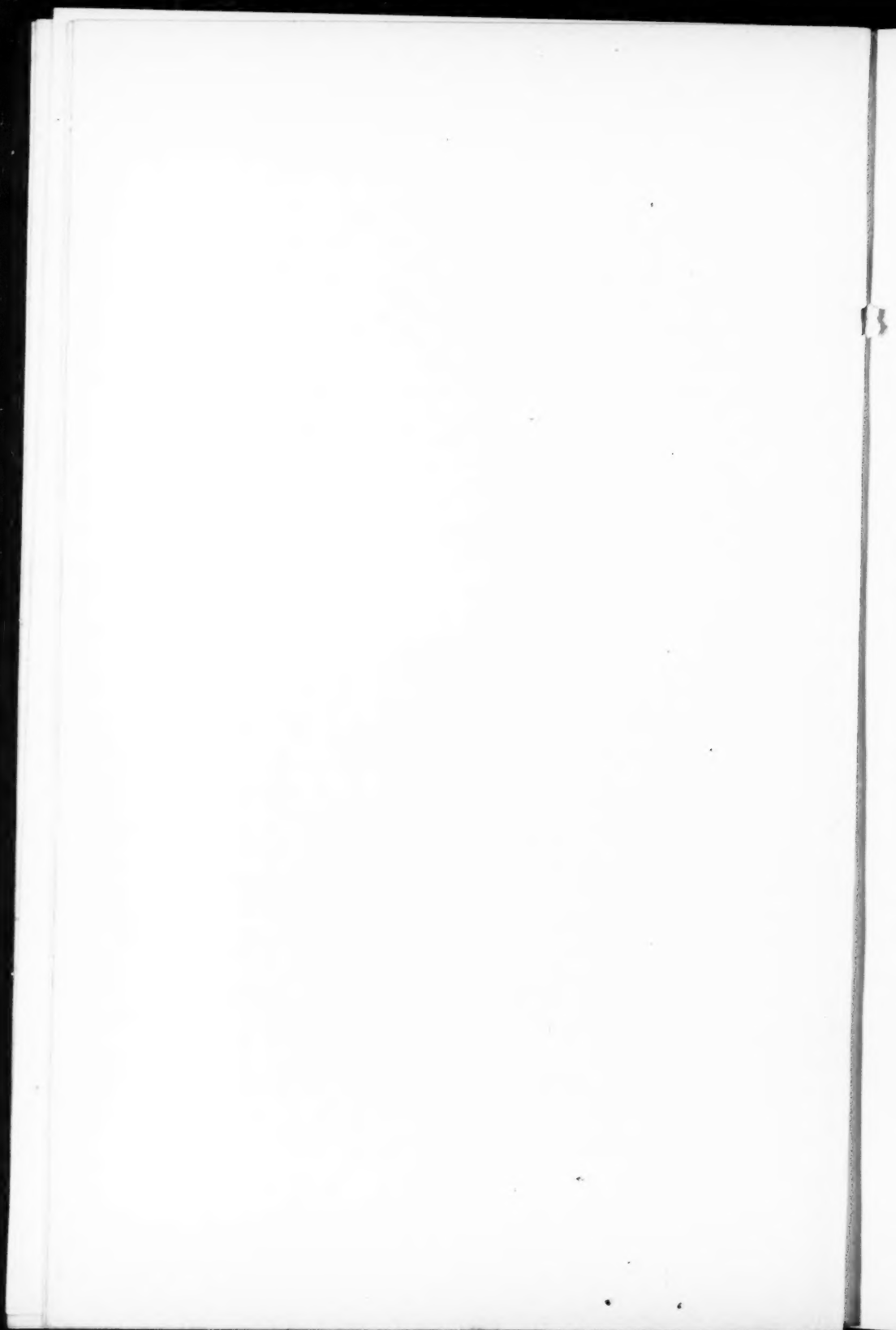
The work is furnished with an excellent map on a sufficiently large scale, 1:100,000, to enable the operations to be followed step by step.

Of course the methods followed, and the solutions arrived at, are not the only ones possible under the given conditions; but officers who will take the trouble to study the very clear and complete exposition given in this book of those finding favour in the Germany Army, will have taken a good step forward in the study of applied tactics.

*Aide-Mémoire de l'Officier de Marine.* By E. DURRAISSIER, Chef de Bureau au Ministère de la Marine, and C. VALENTINO. Paris: Baudoin, 1896. 3f. 50c.

The ninth issue of this useful work of reference opens, as it did last year, with comparative tables of the battle-ships, armoured-cruisers, cruisers, and other vessels of the different Powers. The authors exclude all ships built over twenty years, and also all vessels building and not yet ready for their trials, and they credit England this year with forty-six armoured ships, as against forty-two for

France, sixteen for Russia, twenty-one for Germany, and ten for Italy; in the matter of unarmoured vessels, they admit an undoubted superiority lies with this country, which is credited with 171 cruisers, torpedo-gunboats, and torpedo-destroyers, etc., as against fifty-three French, thirty-five Russian, forty-one German, and thirty-nine Italian. Passing to the contents, which are practically the same as in the last two editions, the book begins with a valuable *résumé* on international maritime law, which includes chapters on territorial waters, the definition of the terms "ship-of-war" with its rights, immunities, etc., on merchant ships, reprisals, state of war, neutrality, blockade, contraband of war, right of search, and other kindred subjects; then come tables of rates of pay of naval officers in the different Services, followed by a chapter descriptive of the various types of ship in the German, English, Austrian, Italian, Russian, and United States Navies, showing their method of construction, machinery, armament, and defensive powers; after which are the usual tables of the war-ships of all countries, with the names, dimensions, armament, etc., of each ship. A chapter on guns, accompanied by minute and exhaustive comparative tables, comes next; and an interesting chapter on torpedoes, submarine mines, torpedo-boats, catchers, and torpedo warfare generally, practically concludes the book. Those having friends in the French Navy will find the Rank List of the officers at the end of the book of interest, and there is, further, a useful list of the ships in commission, with their different stations and the rank of the officers in command.



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*i.e.*, **EIGHT** out of **THIRTEEN** who went up. N.B.—This does not include Officers who qualified, but were unsuccessful. \*Nominated for admission.

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